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AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

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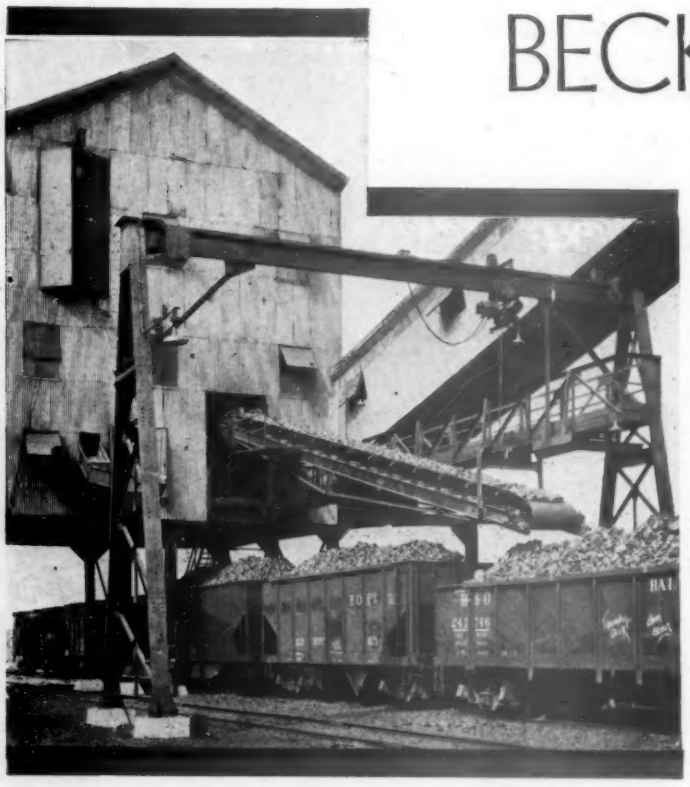

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Established 1859 — Pioneer of the Gas Industry
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Executive and Editorial Offices, 53 Park Place, New York City

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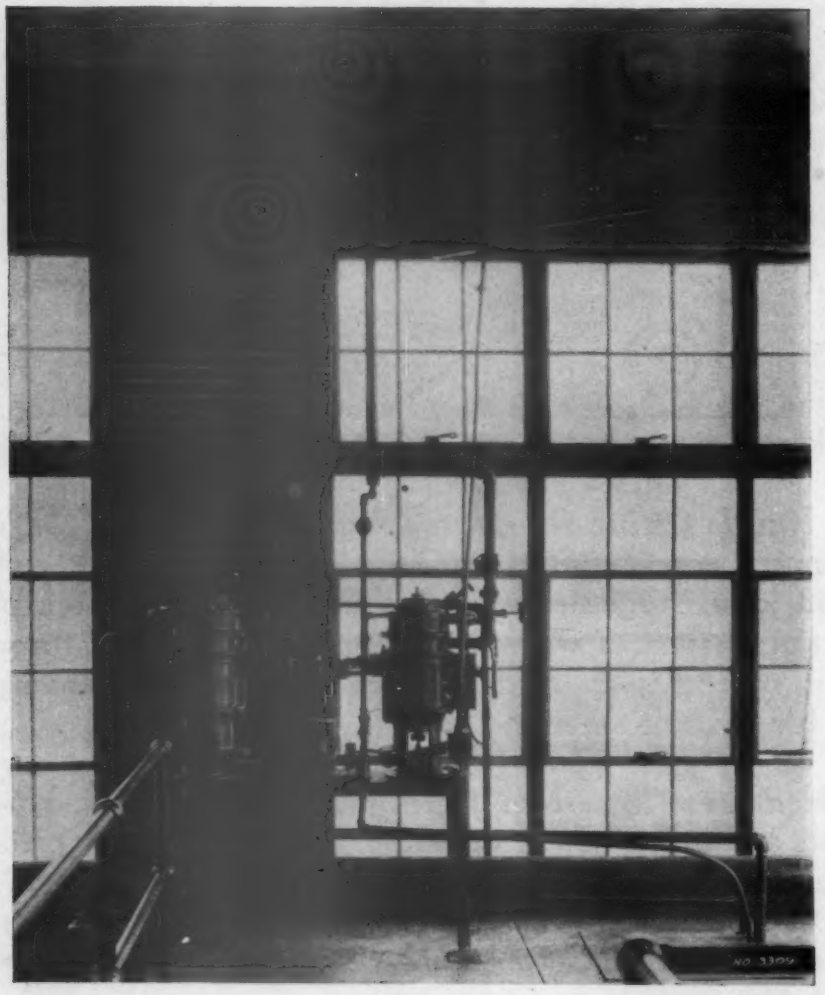

This Smoot Gas Mixing Control at the Binghamton Gas Works, Binghamton, N. Y., mixes manufactured gas with natural gas.

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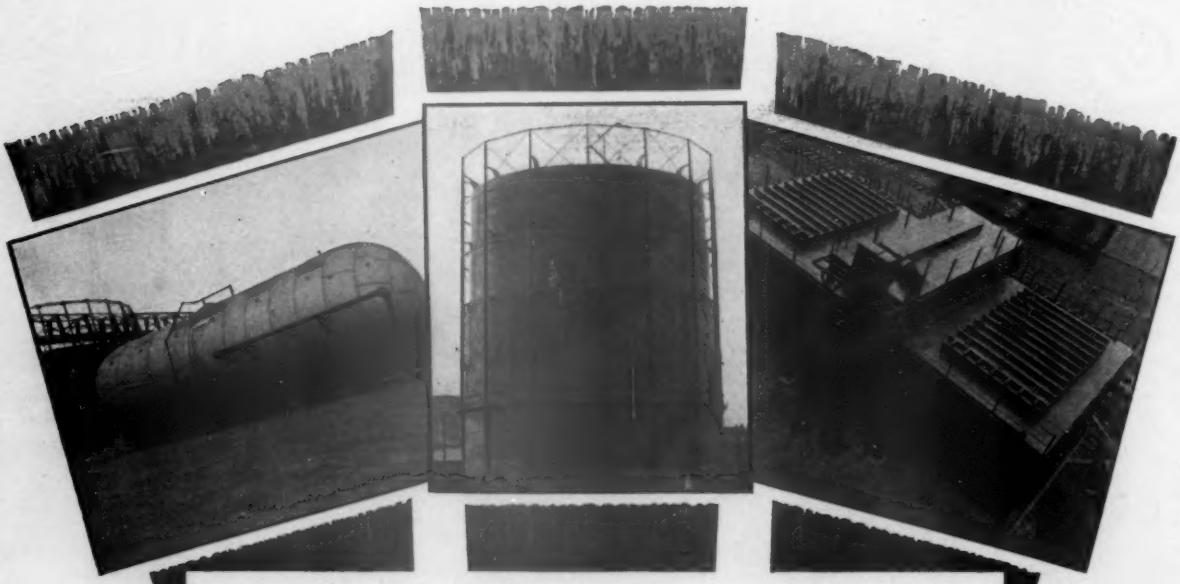

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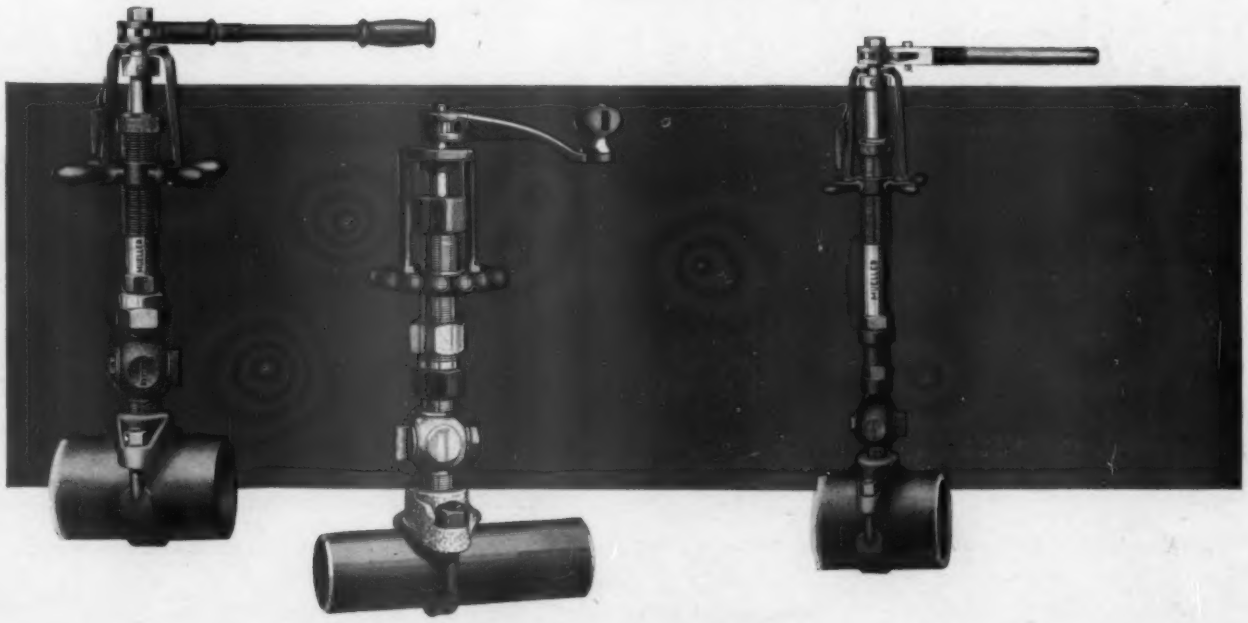
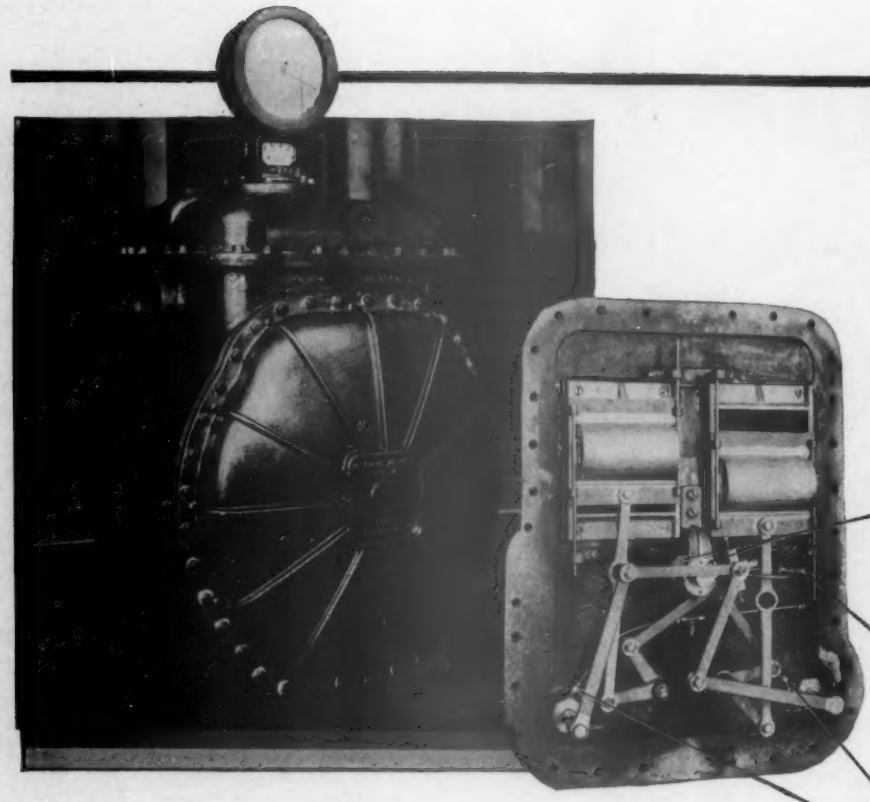


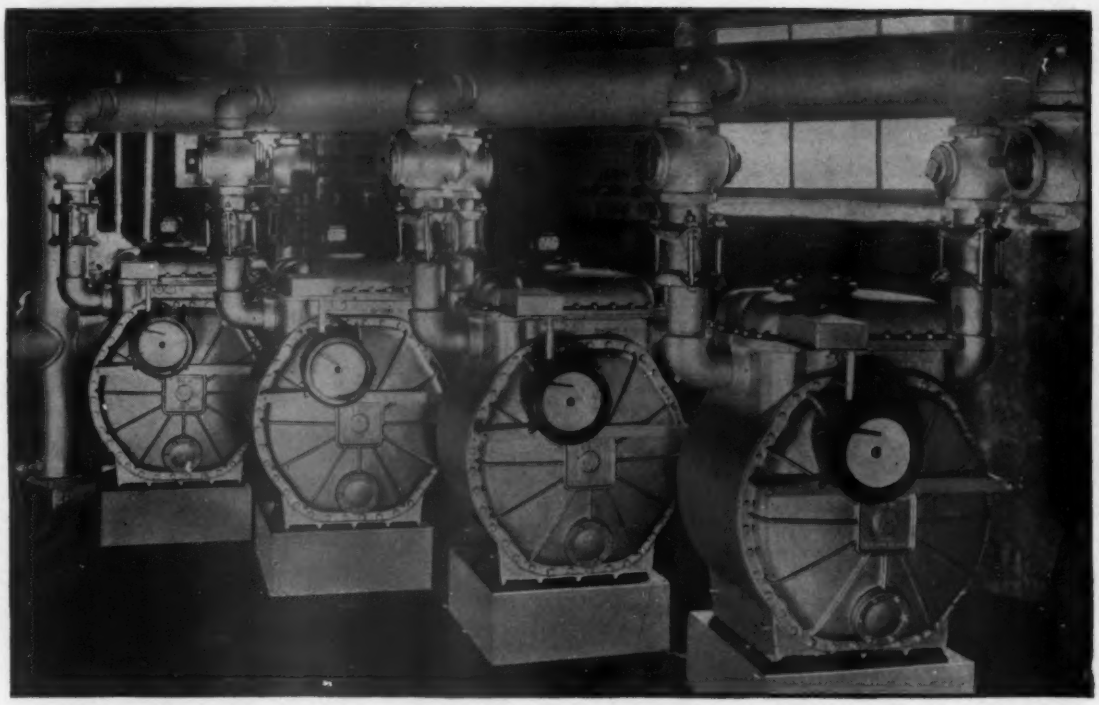


What Does "Metric" Signify In Ironcase Meter Construction?

TO general specifications for the purchase of ironcase meters the trade name "Metric" promptly adds a bill of particulars —an impressive number of exclusive features that are desired for greater operating economy.

In the construction of ironcase meters, for example, "Metric" signifies that the case, table, partition and channels are all cast in one piece. No machine joints and gaskets. No separation of interior divisions through strains or climatic changes. The result is elimination of interior gas leakage. This is an important feature in the accurate operation of "Metric" ironcase meters under minimum pressure.

In the larger sizes of ironcase meters



An actual photograph of an Industrial Installation showing four 500-B Metric Ironcase Meters equipped with GG-9 Recording Demand Attachments operating on the lines of the Public Service Company of Northern Illinois.

"Metric" signifies Alemite lubrication, Timken Bearings and a special valve motion. All of these features of construction have been used with success for the past five years. They minimize friction and proportionately reduce the wear of moving parts.

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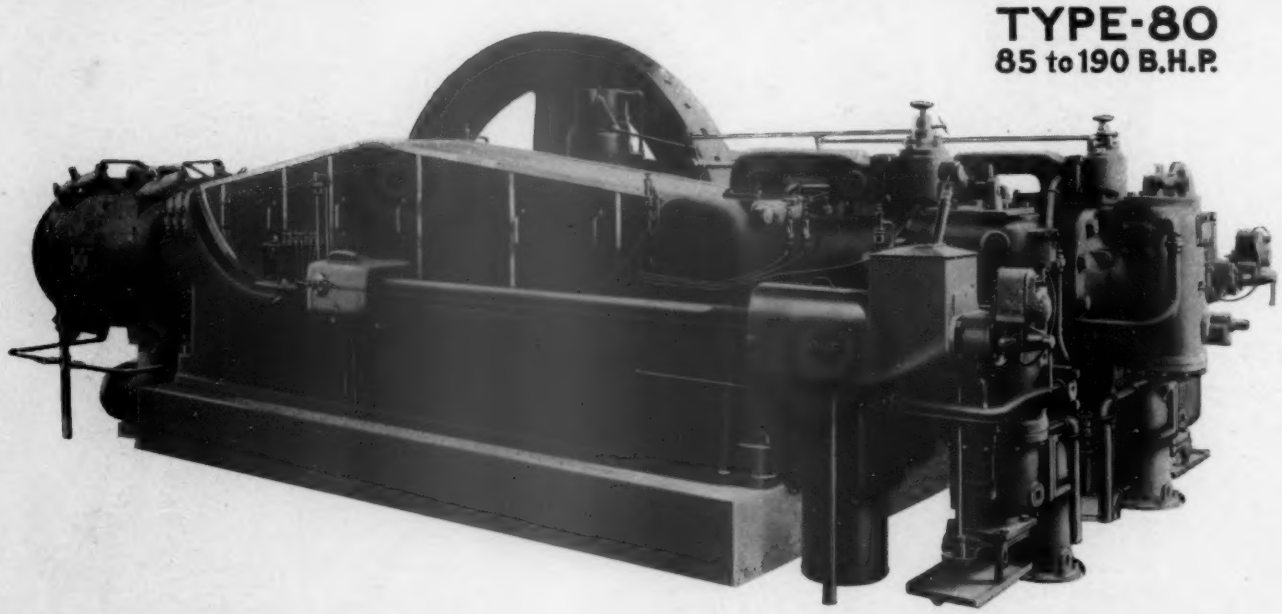

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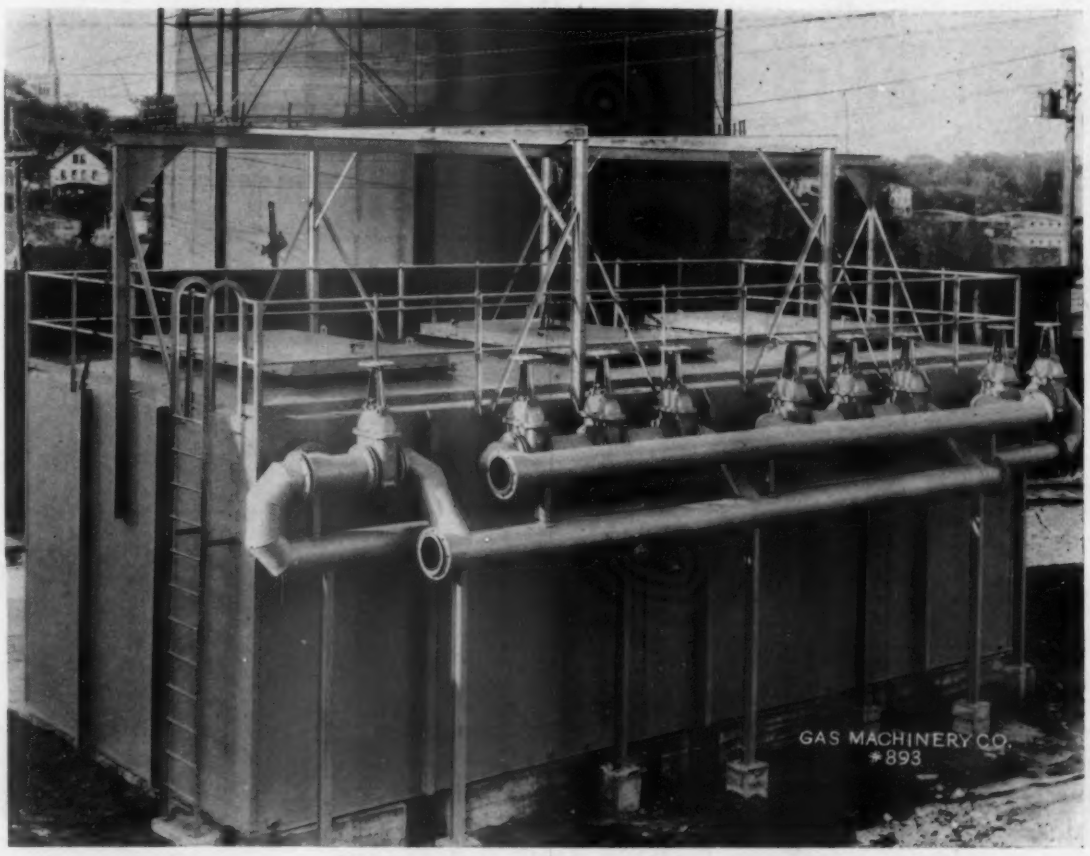

The purifiers shown in above halftone were recently completed for a rapidly growing eastern company.

The structure is divided by two partitions into three purifier boxes and the flow of gas is controlled by the valve manifold designed to permit the flow of gas thru the several compartments in the following rotation:

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B, BA, BAC,
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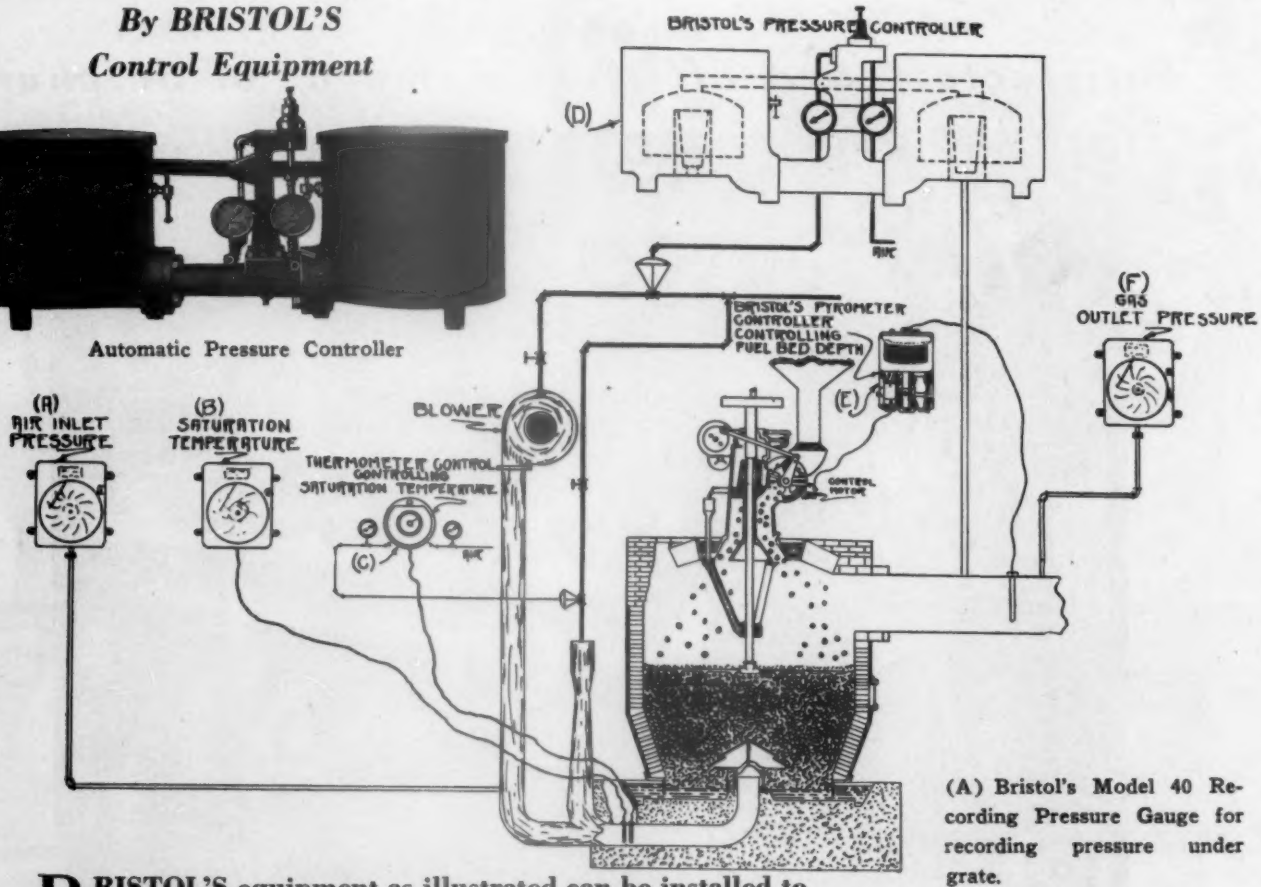

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(E) Bristol's Model 479 Pyrometer controller for controlling fuel bed depth.

(F) Bristol's Model 40 recording pressure gauge for gas outlet pressure.

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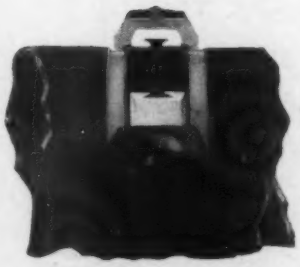

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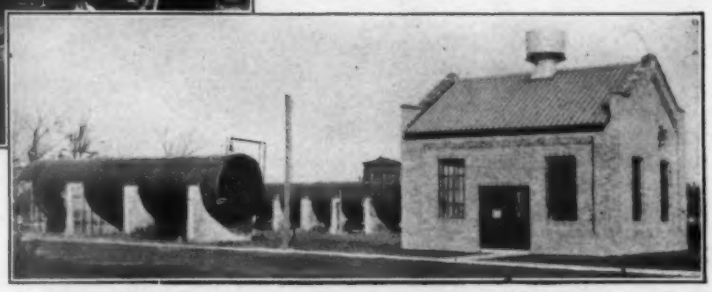

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For further facts about cast iron pipe for water, gas, sewers or industrial uses, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 People's Gas Building, Chicago.

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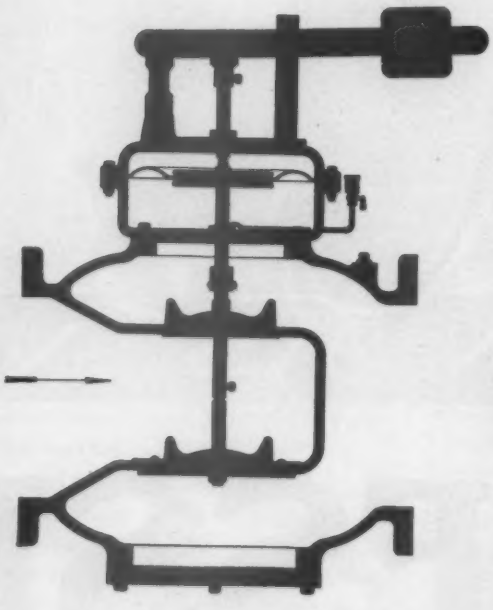
REDUCING GOVERNOR

Connelly Governors were depended upon by the old time gasmen of fifty-five years ago to take care of their distribution problems, just as the present day gasmen, in the manufactured and natural gas industry, place implicit confidence in these reliable Governors to regulate with precision the smooth, even flow of gas through their low and high pressure mains.

When the trend toward high pressure distribution over long distances became an accepted fact, it was but natural that Connelly Reducing Governors would be called upon as best fulfilling all requirements for high pressure work, hence the steadily growing demand.



The outstanding feature of the Connelly Reducing Governor is the assurance of a close seal without sticking, made possible by the parabolic shaped balanced valves. Uniform outlet pressure is maintained regardless of fluctuating inlet pressure, by a patented adjustment of the sensitive valve mechanism.

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IT is a costly job to lay several lines of pipe across a stream—costly in time, labor, and extra material and equipment involved. Experienced engineers know just where to begin in making certain that the investment will be properly safeguarded. They first make sure of the right pipe—knowing that this is the foundation of successful submerged pipe lines.

The photograph above shows one of the crossings of a 200 mile, 18-inch, NATIONAL Pipe line. Laying of this line involved crossing the Mississippi and four other rivers in addition to swamps, stretches of gumbo, etc.—a job requiring sound engineering practice and reliable materials.

The extensive use of NATIONAL Pipe for lines involving exceptional engineering difficulties is substantial evidence of the dependability of this product for installation where future repairs would be costly with possible extended delay of service. Dependability under all conditions of service is the first requirement in the manufacture of NATIONAL Pipe—one of the reasons why NATIONAL is

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EASY TO TURN ON OR OFF—NEVER BINDS
SELF CLEANING—CANNOT CLOG
ALIGNS EASILY WITH SERVICE AND REGULATOR LINES THEREBY REDUCES SERVICE LINE BREAKS

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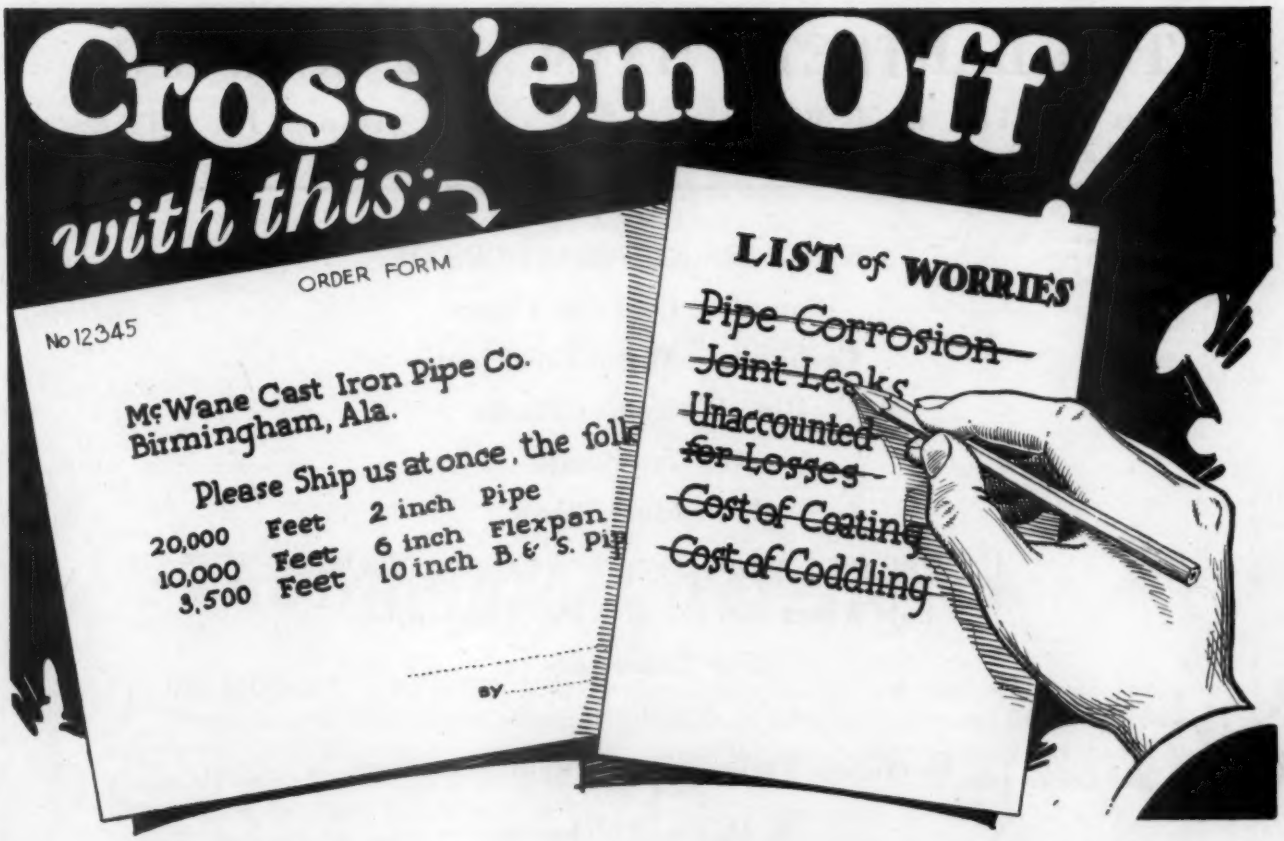

Cast Iron's New Advantages—

Not all gas executives yet realize the strides cast iron pipe is making in the gas industry. This *permanent* pipe has been modernized to the point where old objections are gone, and new advantages for the gas man added.

McWANE cast iron pipe combines strength with modern weights—yet it is a SAND CAST pipe. It gives you rustproof pipe yet with gas-tight joints. It affords *permanent* pipe in sizes as small as 1¼ and 2 inches—as large as 12 inches.

McWANE Ends These Troubles:

McWANE Cast Iron Pipe means the end of coating and coddling your mains.

The various McWane Joints hold the gas. "FLEXPAN" Joints for gas pressures up to 100 lbs. remove the difficulty with joint leaks. Also threaded joints (without couplings); B. & S., plain end, or cast for special types of couplings. There is a McWane pipe for every gas need.

No costly treatment is needed to make McWANE cast iron gas pipe last. You lay it—and forget it. Making its cost *per year* lowest of all.

Write for full data, and list of big gas companies near you using McWane pipe.

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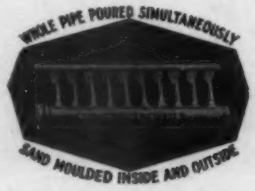

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GAS HOLDERS

THE BARTLETT HAYWARD COMPANY'S MAIN PLANT

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

HENRY M. RILEY, *Editor*

The Manufacturer-Partner

THE MUTUAL DEPENDENCY of the gas man and the manufacturer of equipment and appliances was rather succinctly defined by Mr. H. J. Long at the recent Regional Sales Conference at Mohonk Lake when he said, "I like to feel that my business is just as important to the gas business as the gas business is to me. In other words, I consider myself in the 'Gas' business, not merely a manufacturer of a certain product." He went on to say further that he assumed the position of a partner and as such was entitled to give the Industry the benefit of his experience.

Notwithstanding the truth of the above observation, it is remarkable how the gas company and the manufacturer, partners in a common endeavor to make a success of their business, at times regard each other as necessary evils, to be accorded at best but passing toleration. And in this connection the gas man is perhaps a trifle more grudging in his show of affection for his "partner."

The average manufacturer of appliances or gas making equipment clearly appreciates that his product must meet the requirements of his partner, the gas man; otherwise he would display gross stupidity in indulging in his particular manufacturing venture. Next, he knows that his partner is many times in a position to advise with him, to the end that the device or appliance being exploited can be improved to suit the case in point. Lastly, the manufacturer is holding a bit more of the bag than is the gas man. If he fails he simply becomes a defunct partner and, so to speak, passes out of the picture.

In turn, the wide-awake gas man knows that the success of his business depends on his being supplied with more efficient equipment and more modern and more saleable appliances. Consequently he is ever on the alert to ferret out the good basic points in a new item. He does not unnecessarily permit the manufacturer or his representative to fret away his time in the outer office and then give him an impoverished hearing. Nor does he humor his own personal whims in dismissing the representative by way of the "secretary route." He knows that at some future date some one is going to call on him with a more efficient device for doing a certain operation; he hopes that some inventor or manufacturer will enter his office with the basis of a plan for effecting house cooling in an economical way.

The manufacturer is not a necessary evil, he is a partner of the gas man and is entitled to a hearing. In turn, the manufacturer must also recognize that the gas-man-partner must not be pestered.

"Cellarology"

THE PERSON who purchases a home with a spick-and-span cellar is truly a most fortunate individual. Take a look, if you will, at the average cellar in the new house, regardless of its initial cost and the neighborhood in which it is located. What do you see, we would ask? Just another cellar. Merely a necessary evil, it would appear, which has been thrown together "like milking a cow on the run." The windows do not fit like those in the living room; floor joists have been brought to level by the banal expedient of hastily mashing an improvised wooden shim between them and the main supporting beam; nail points protrude like the quills from an aged porcupine; and, we regret to say, the way the average meter is supported and the manner in which the gas piping has been run are certainly nothing to rear up and cheer about.

With the rapid introduction of gas househeating some gas men have become cellar conscious but, the mourner's bench is quite roomy and can still stand a goodly number of penitents.

Let us assume a gas customer with a relative modern home desires to install gas househeating and further, wants his cellar converted into den or billiard room or a play room for the children. Immediately, in order to be sure of a proper job, it is necessary to rerun the gas piping or else build a somewhat expensive ceiling. There does not seem to be any valid reason, in this connection, why the gas piping originally should not have been run between the floor joints, notching where it must cross any joist, instead of being run on the bottom of joists. The supporting of the meter and regulator also should be carried out with the feature of neatness in mind.

Here again is a situation which will be helped by a better understanding with the architects and builders. In the meanwhile we can hold up our end of the argument by doing a neat workmanlike job.

Suburban Locations For Industrial Plants

LITTLE THINGS often determine new plant locations. And plant locations often are of great consequence to distribution engineers of the gas company. Hence it is always appropriate for gas men alertly to watch for new enterprises about to locate in their community and to cooperate in securing for them mutually convenient sites where the supply and use of gas may contribute to profitable operation.

With the wider use of natural gas there come new possibilities in supplying this fuel efficiently at points outside the congested business districts. In fact, it will often be most convenient to furnish large quantities of gas at suburban points instead of at central locations where the load simply is piled on top of house-heating and commercial requirements.

Through the local chambers of commerce, boards of trade, and other bodies, the gas executive can often learn of new industries coming into their territory. They can cooperate in making the attractions offered to the new-comer more enticing and they may occasionally even be able to influence him in the selection of a site. It is in this latter effort that more attention should now be given to suburban locations than has ever before been possible. A good geographical distribution of demand is just as important as a good seasonal load factor. In dealing with new-comers this point should be very clearly in mind.

"A Bigger Conception Of the Gas Industry"

"ON THE WHOLE we have found the change to natural gas and the subsequent problems extremely interesting. It is an experience every gas man should go through once in his lifetime if possible. It widens his viewpoint and gives him a bigger conception of the industry." This is one of the most stimulating suggestions made in the extremely interesting paper presented by William A. Dunkley at the Southern Gas Association meeting in June. It suggests the large opportunity as well as the large responsibility which lies ahead of those hundreds of gas men who are still to experience the problems which Dunkley discussed.

And gas men needed this stimulus. As an industry we had become a bit "stale" and all too complacent in our technical advances. We had not realized that the real job of the industry was being done only partially and in that part rather badly at times. We had not by any means lived up to the opportunity of being the major conveyor of heating energy for municipal and suburban supply.

One of the outstanding "magnates" of the electrical business recently stated that the gas business is going to be at least 50% greater than the electric business within a few years. He said this with great evidence of envy in his manner. Many of his contemporaries in the electric business are proving their belief in the forecast by their active efforts to insure electrical management participation in the enlargement of the gas business. Thus from our best-informed contemporary we get striking proof of the magnitude of the movement going on in our own affairs.

It has recently been estimated by a competent engineering group that from 20 to 30% of the entire energy supply of the nation, including coal, oil, water power, and gas, will have to be furnished to the ultimate users as gas. This same group has estimated the prospective shrinkage of coal consumption amounting to the amazing total of nearly 100,000,000 tons per year. It is rather difficult to think sanely and plan effectively for programs of this magnitude. The best brains which the industry can command will be required to do the job well. But the job will be done and for the public good must be properly executed. It is time for those who think in small units or whose pessimism seems unable to grasp these larger concepts to resign positions of authority and leave the jobs to those who are willing to take on big projects with big problems demanding solution in a big way.

Mechanical Devices in the Home

WHILE it is true that the widespread introduction of mechanical devices and equipment into the home has very materially lessened housekeeping labor it must be borne in mind that such appliances have also brought with them the problem of up-keep. And, indeed, at least in considering electrical appliances, there is still a requisite amount of labor to be expended in actually operating them. Thus, vacuum cleaners, floor waxers and the like literally exact a definite quota of "elbow grease" in their operation. Virtually all of the gas appliances which embody some mechanical feature stay put, so to speak, requiring no muscular exertion while they perform their particular tasks.

However, all devices with mechanical features do get out of order at times. A spring will weaken and function below par, a thermostat will get out of adjustment, a burner will act out of coordination with the other parts of an appliance, and so on.

This latter condition, from the gas company's standpoint, entails the close watching of two points: first, only those appliances should be selected for sale which appear to offer the least likelihood of getting out of order; second, in no case should a prospective buyer be led to believe that the appliance will *never* require adjustment of one sort or another. High class salesmanship will in a subtle way apprise the buyer that of necessity the appliance will at some time need servicing. Thus, it will not be necessary to either dodge the issue by leading the prospect to believe the appliance is foolproof or crudely bring up the idea that it *is* very likely to "get out of whack."

In selling, as well as advertising home appliances which depend on some mechanical feature, there is perhaps a trifle too much tendency to over-emphasize the unlikelihood of their needing servicing from time to time. Such salesmanship is not warranted.

Taking a Plan to Market

Reconsidering Fundamentals Of Producer Operation

GAS producers have assumed new responsibilities in many gas works during recent years. In order to secure the most efficient application of surplus coke, especially smaller sizes, it has been necessary to make large quantities of producer gas for plant uses.

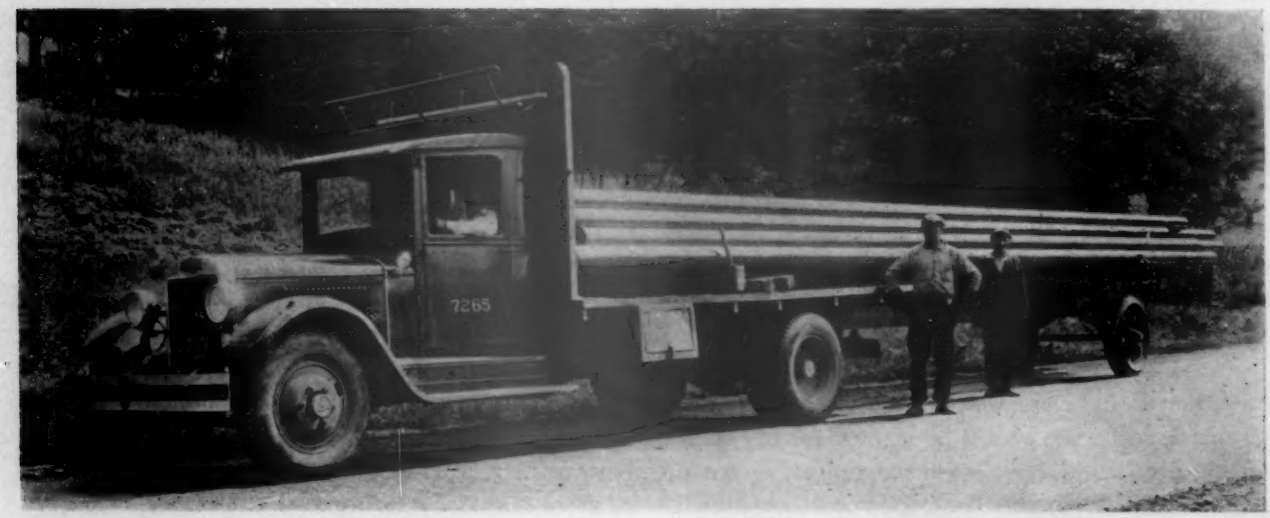
In this issue AMERICAN GAS JOURNAL begins a short series of articles which discuss in an elementary way the types and performance of gas producers. In presenting this group of manuscripts we hope to stimulate more thoughtful attention to what, in many plants, seems to be rather neglected operating detail.

Even those plant engineers who are not now operating gas producers can profitably keep in touch with developments in this field. All of them must know of such developments in order to borrow from gas-producer practice any improvements that may be applicable to other types of gas-plant operation.

The gas sales force should also be acquainted with gas producer developments. Oft-times the sale of industrial gas hinges upon the question of the relative efficiency of producer and of utility supplies. We trust that many readers will find this series of contributions helpful in going back to those fundamental considerations on which they must base their current reading and their current operating and sales effort.

Modern Equipment Indispensable in the Construction of Gas Pipe Lines

Upper left—The Back Filler at work
Above—Wheel-type Ditcher
Left—Ladder-type Ditcher
Below—Transporting long lengths of pipe with truck



Design and Construction of Pipe Lines for the Transmission of Gas

J. A. MESSENGER

Engineer of Pipe Line Construction, United Engineers & Constructors, Inc., Philadelphia, Pennsylvania
Affiliated with United Engineers & Constructors, (Canada), Limited

WHILE all this extensive development in pipe line construction for natural gas has been going on, the manufactured gas interests have begun to realize that manufactured gas can be transported in a similar manner, making it possible to manufacture gas in large quantities at points where the manufacture can be carried on most economically, and the gas marketed in smaller municipalities not so well located from a gas manufacturing standpoint.

Thus we have systems similar to the one in Connecticut where coke oven gas manufactured on tidewater at New Haven is carried in a northerly direction through the state to Meriden, Cromwell, New Britain and Hartford. And also the one in Indiana where coke oven gas manufactured at Terre Haute, Indiana, is carried to Paris, Illinois, to the west and to Greencastle, Martinsville, Bloomington and Bedford, Indiana, to the east.

The proposed pressures to which systems of these kinds are to be operated run as high as 350 pounds per square inch at the manufacturing plants and I would not be surprised if even higher pressures might be used in the future.

The design and construction of large natural gas lines, is a good deal different problem from the design and construction of lines for the transmission of manufactured gas. This is due to the fact that the manufactured gas lines are not called upon to carry the volumes of gas required in the natural gas lines, neither are the distances as great or the pressures usually used as high. I shall thus confine myself entirely to the manufactured gas field, which I feel is ample scope for a paper of this kind.

Right of Way

In the design and construction of a pipe line, probably the first thing to be considered is the selection of the right of way. This right of way can either be along the shoulder of a public highway or along a private right of way obtained for the purpose. In selecting the right of way the following things should be considered:

1—What underground structures will be encountered if a location along a highway is selected. In thickly settled sections it is sometimes advantageous to select a private right of way in order to get away from such structures.

2—The amount of gas that can be sold from the line if it follows the highway and which would not be sold if the line followed a private right of way not close to the highway. In some instances these sales from the line have been sufficiently large to carry the cost of the line. Thus, these gas sales should be very carefully considered.

3—The difference in the length of the line if laid on the highway and if laid along a private right of way. If in order to follow the highway the line has to be considerably longer this point may be the deciding feature.

4—The cost of construction of the line. In most cases, the construction of a line along a highway is about the same as that along a private right of way, because while the actual construction may run higher, the material can usually be distributed cheaper, the gangs serviced at less cost and property damage claims will run lower. Along a private right of way, however, you have the advantage of being able to do pretty much as you wish with a lower cost of trimming up the ditch after work is completed.

5—The cost of the private right of way as compared to the costs of permits for running along the highway. In some of the states, permits for running along the highway cost so much and the trouble entailed in securing these permits is so great that lines are always run along a private right of way that in most cases parallels the highway.

Size of Line

It is a comparatively easy matter to decide on the size of pipe to be used as it depends entirely on the volume of gas to be passed during peak periods, the length of the line, the specific gravity of the gas and the initial pressure to which the gas is to be compressed. In cases where peak loads are very high requiring a much larger line than would normally be necessary it is often cheaper to install some type of pressure holder near to the point of maximum consumption, thereby making the use of a smaller line possible. In figuring

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Abstract of a paper read before Annual Convention, Canadian Gas Assn., Halifax, N. S., June 24-25, 1930.

the size of line, future development should of course be taken into account and the line made of proper size to take care of the future increase in gas sales.

Kind of Pipe

In most cases ordinary steel line pipe as manufactured by the various tube and pipe companies in accordance with the specifications of The American Petroleum Institute is used. There are, however, some patented pipes on the market, such as that manufactured by A. O. Smith Company of Milwaukee, Wisconsin, or Naylor Pipe Company of Chicago, Illinois. These pipes have their good features and should be considered.

There is also on the market scale free pipe as manufactured by The Republic Iron and Steel Company and many of the tube mills are in a position today to furnish descaled pipe. The advantage of scale free or descaled pipe is that any coating applied to the pipe has a better chance of permanently adhering if the pipe is free from all scale.

In deciding upon the weight of pipe to use not only the working pressure should be considered, but also whether or not you desire to have extra wall thickness to compensate for corrosion and pitting. In most cases standard weight pipe is used even though the structural strength of this pipe is far beyond that necessary for the working pressure to be carried. In some cases, however, engineers are now using lighter weight pipes and depending on coating to protect against corrosion. This procedure saves a considerable item on the initial cost of the installation and in soils that are not extremely corrosive or wet and heavy seems to be perfectly good practice.

Coating

The subject of pipe coatings is one that has received much consideration in late years both in The American Gas Association and The American Petroleum Institute. Many samples have been buried by the Research Departments of these organizations as well as the Research Engineers of The Department of Standards of The United States Government. Up to date no one of these samples has been in the ground long enough to definitely tell the relative merits of the various coatings on the market.

In general, coatings are divided into two classes, wrapped and unwrapped.

The wrapped coating consists of a mopping of bituminous material of some kind applied hot, a spiral wrapping of felt roofing paper (usually twelve pound felt) and an outside mopping of the pitch. These coating can be applied in as many plies as desired. Also pipe can be bought which is wrapped at the mill with the ends bare for joining.

The principal function of the felt wrapping is to reinforce the coating so as to add structural strength to it and to make it possible to apply and retain a thicker coating on the pipe.

The unwrapped coatings are in turn divided into two classes, the cold and the hot applications.

There are a number of hot coatings or enamels on the market. They are either tar or asphalt products and the application of all of them is about the same. For their application they require a priming coat applied on the pipe in the mill, a coat of cold solution and a coat of hot application, applied in the field. On the smaller sizes up to and including six inch the hot coat can be brushed on, while on the larger sizes the hot coat is better applied by the hand method.

The cold applications are either cut back products which depend on the evaporation of the light oil cut backs for their setting up, and asphalt emulsions which set up when the water in which the particles of asphalt are suspended, evaporates.

Whether to coat or not to coat a pipe is also a question that has been much discussed. Up to the present time there seems to have been no quick, cheap and accurate means discovered by which the extent of the corrosive action of a soil can be determined. Where light weight pipe is used it should always be protected by a coating. Standard or heavy weight pipe can be laid bare in soils that are light, sandy, and well drained without fear of disastrous corrosive effects.

Electrolysis

In built up sections, or when a line is to be laid in the vicinity of electric railroads an electrolysis survey should be made and the line protected against stray currents. This protection can be effected by either draining or insulation, and both methods are extensively used. It is our feeling, however, that insulation affords a better protection against electrolysis than drainage and has been adopted as the standard practice of The United Gas Improvement Company.

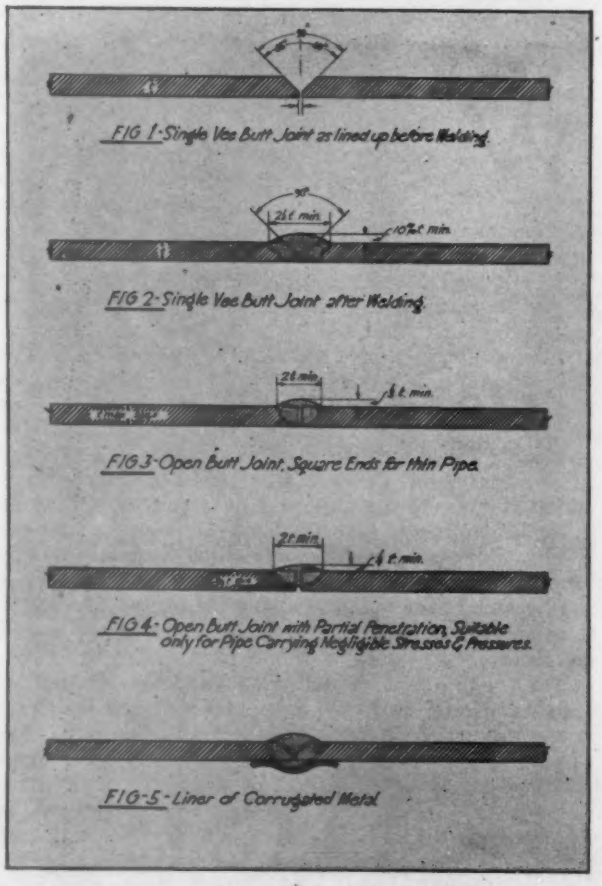


FIG 1-Single Vee Butt Joint as lined up before Welding.
FIG 2-Single Vee Butt Joint after Welding.
FIG 3-Open Butt Joint, Square Ends for thin Pipe.
FIG 4-Open Butt Joint with Partial Penetration, Suitable only for Pipe Carrying Negligible Stresses & Pressures.
FIG 5-Liner of Corrugated Metal

Joints

Steel pipe lines can be either coupled or welded. Both methods have produced entirely satisfactory lines. Thus, the controlling factor in deciding whether a line should be coupled or welded should be the cost. In our experience the costs of the two methods of joining are about equal for a ten inch pipe. For sizes

smaller than ten inch welded lines are cheaper, while the coupled lines are cheaper for sizes above ten inch. These conclusions are based on costs obtained when using Dresser couplings.

Outside of screw couplings which are seldom if ever used there are two types of couplings on the market. A sleeve coupling, similar to the Dresser or Dayton, and a special coupling such as the Victaulic.

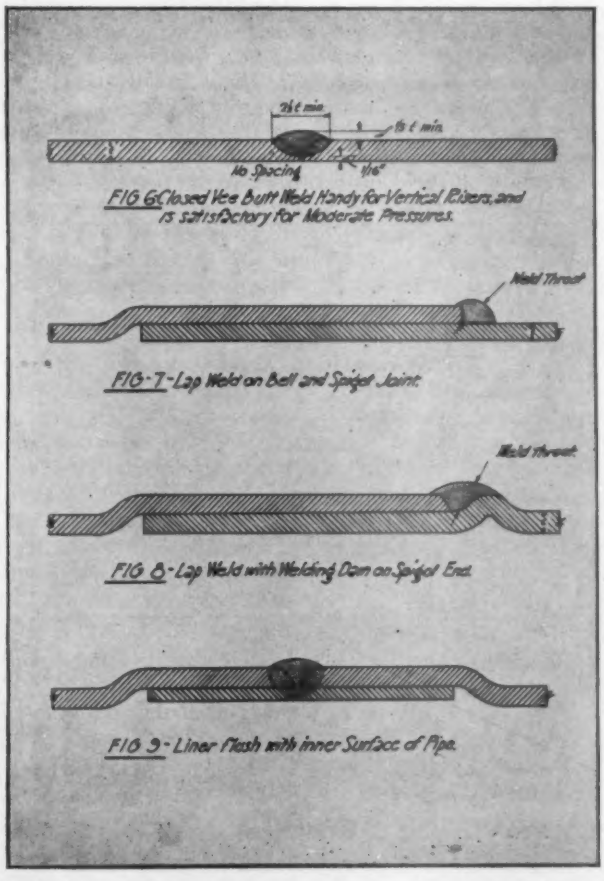


FIG 6 Closed Vee Butt Weld Handy for Vertical Risers, and is satisfactory for Moderate Pressures.

FIG 7 - Lap Weld on Bell and Spigot Joint

FIG 8 - Lap Weld with Welding Dam on Spigot End

FIG 9 - Liner Flush with inner Surface of Pipe.

The first of these two types of couplings has been used for years and their performance in service is known. The second is comparatively new and so there is still some uncertainty as to how it will function in service. Some installations have been made using this coupling and as far as I can learn they have to date proved satisfactory.

When lines are welded either the electric arc or the oxy-acetylene method can be used.

Tests have developed the fact that an entirely satisfactory weld can be made by the electric arc method. Thus, in deciding the method of welding to use the cost and the convenience of the method should be carefully considered.

We believe it to be true that it takes a more experienced welder to produce a good gas-tight arc weld than it does to produce a similar gas weld. In most locations electric welders demand a higher rate than gas welders and are at the same time harder to secure.

Another item to consider in comparing the relative costs of electric and gas welding is the purchase price of the equipment necessary to do the work by each method.

In a recent study made by us it was determined that on a 6" line if the electric welders could be secured for $1.00 per hour and would make 25 welds per day per man, it was possible to save $200. per mile over gas welders at $.90 per hour making nineteen welds per day per man.

We feel that electric welding is coming, but that at the present time it has not reached a stage of development where it can be universally used on pipe line construction. Thus, each case should be carefully considered and the method of welding to be used decided on its adaptability to the particular job under consideration.

Design of Welds

The requirements of a welded pipe line joint are few and easily stated:

1st—The weld should develop the full strength of the pipe.

2nd—The weld should retain its ductility.

3rd—The joint should offer a minimum resistance to flow.

4th—The weld should be simple in design and cheap to make.

The single open vee butt weld (Figure 2) meets all of these requirements. This is the type of welded joint that is most extensively used in pipe line construction and in fact may be called the standard welded pipe joint.

Tests have shown this to be the strongest type of welded joint and is the only type of welded joint which the A. S. M. E. Boiler Code Committee allow used on low pressure vessels.

This type of joint is recommended for standard, extra heavy and double extra heavy steel pipe for all pressures and services. When using this type of weld the pipe mills will furnish the pipe beveled for welding as shown in Figure 1.

In lining the pipe up for welding a space is left between the ends of the pipe to allow for the expansion of the metal in welding and to permit the ends of the pipe to draw together in cooling. This also prevents the overlapping of the edges and reduces residual strains.

The weld is usually reinforced about one-fourth of the wall thickness, as shown in Figure 2. This reinforcement should slope down gradually from the center to the surface of the pipe along the sides of the weld. The total width of the weld should be roughly two and one-half times the wall thickness of the pipe.

When this type of weld is used great care should be exercised to see that fusion takes place to the full depth of the weld as shown in Figure 2 and that molten metal reaches the extreme bottom or "root" of the joint.

On pipe having a wall thickness of from 3/16" to 5/16" the open square butt weld illustrated in Figure 3 can be used. In using this weld the reinforcement is usually made heavier than in the open single vee butt weld to compensate for the possible lack of full penetration. In this type of joint it is also hard to get full penetration to the "root" of the weld without getting "icicles" on the inside of the pipe. This type of weld is recommended for standard pipe up to 2½", extra heavy pipe up to 1½" and for all pipe whose wall thickness does not exceed 3/16".

The closed single vee butt weld shown in Figure 6 is occasionally used because of certain advantages but it is not recommended as the best practice. It is simpler to line up the pipe for this type of weld especially

when building risers where one length of pipe is placed on top of the other. It is also a much easier weld to make as penetration does not go to the inside wall of the pipe. This type of weld is also more heavily reinforced to make up for this lack of penetration.

This type of weld will not develop the maximum strength of the pipe but does have a strength comparable to the usual mechanical joints. It may be used in sizes up to 10" but is not recommended. In sizes over 6" the weld should be reheated after completion.

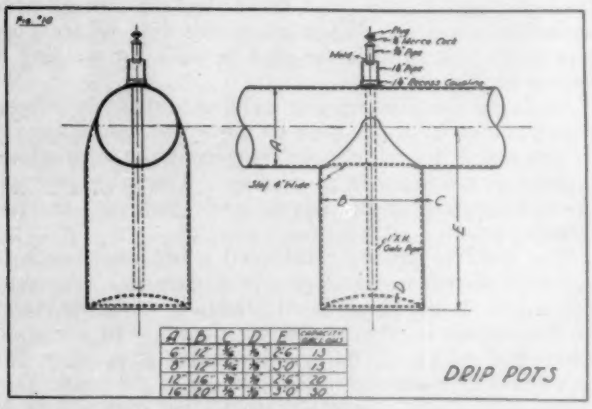
Figures 5 and 9 illustrate two types of joints that are being advocated. Each of these are open single vee butt welds with liners placed on the inside. These liners facilitate the lining up of the pipe and make it possible for even a comparatively inexperienced welder to get full penetration to the root of the weld without getting "icicles" on the inside of the pipe. Also the use of these liners make it possible for an expert welder to go faster and thus turn out more welds a day.

There are also two types of bell and spigot joints on the market which are illustrated in Figures 7 and 8. These types of joints save time in the lining up of the pipe and also speed up the welding. They do not, however, have any advantage from a standpoint of strength.

There is one advantage to these types of joints. In case a weld fails in service the spigot is not likely to pull out of the bell which makes it possible to repair the break without taking the pressure entirely off of the line.

Drips

When gas is compressed and passed through an aftercooler it naturally becomes dry as soon as it starts to expand along the line. Thus, it is not necessary to grade the line and instill drips except as a precautionary



measure for a mile or so from the works. The rest of the line can follow the general contour of the ground with blow-offs placed at the low points. Illustrations of the types of drips and blow offs used are shown in Figures 10 and 11.

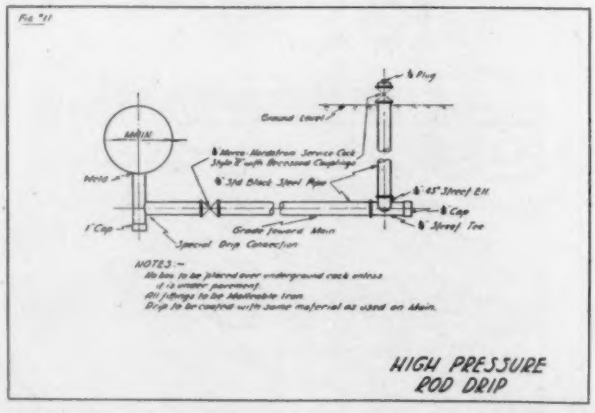
Valves

Valves should be placed in the line every three to five miles for the purpose of shutting off a section of the line in case of a break. Valves should also be placed at both ends of any considerable river crossing, bridge and railroad crossing as these are all places where breaks due to accidents are liable to take place. Either gate valves or plug type valves can be used, but the best practice is to use a lubricated plug type valve so as to be sure that the valve will operate when it is required and that it will effect a positive shut-off.

It is good practice to use valves with extra heavy flanges so as to reduce the danger of breaking a flange in making up the joint. All valves should be put in the line with Vanstone pieces each side. On one side this Vanstone nipple can be welded to the line but on the other it should be made with a sleeve coupling so as to put no strain on the valve due to contraction. This method should also be used where drips are installed.

Bends

Where bends of any considerable degree are required the best practice is to use fire bends that have been made in the shop and sent to the field. Where it is not possible to accurately determine these in advance one or two circles can be made up from which the required arcs can be cut out to make the bends when they are reached. By this method there is very little waste and the job is not held up waiting for the bends.



Bends can also be made by welding together several mitred sections of pipe.

Wherever this type of bend is used the welds should be reinforced by Welding Straps across them. While this method makes a satisfactory job it is not as good practice as the use of fire bends.

Expansion

In the design of a line that is to be laid in a trench and backfilled no expansion joint of any kind need be used. This is due to two reasons:

1st—A line that is buried in the earth is not subjected to as great a range of temperature as is the surface of the earth just above it.

2nd—The skin friction of the earth around the pipe is sufficient to set up a force large enough to counteract any tendency of the pipe to move due to expansion or contraction.

All exposed sections of pipe such as bridge crossings should be protected by expansion joints where they exceed fifty to seventy-five feet in length depending upon the temperature range of the location.

Cover

As the gas being transported is dry there is no point in laying a line below frost. When the right of way is along a heavily traveled highway and the line is liable to be submitted to considerable vibration, a minimum cover of 2' 6" is recommended. Also with this depth of cover the line is protected from traffic that is liable to get on the shoulder of the road and over the pipe.

When, however, the line follows a private right of way across open country it is only necessary to lay the line to a depth that will clear the usual cultivating

operations, which is about 1′ 6″ of cover. A line of this kind should be depressed to 2′ 6″ of cover at all driveways and in crossing roads.

Construction

Before actually starting the construction work in the field the right of way should be carefully gone over and all railroad sidings available for unloading pipe and materials should be located.

The pipe shipments should be scheduled in so that pipe can be unloaded from the cars direct to the trucks that string it along the right of way. This unloading is best accomplished by using a gasoline crane mounted on a truck chassis. Pipe can, however, be unloaded successfully by the use of a gin pole and a winch. The operation is however much slower.

A good man should be placed in charge of stringing the pipe as on his judgment depends the amount of extra hauling that will be necessary to bring in pipe to fill up gaps or to carry away excess pipe.

At the same time the pipe is strung the coating material (if the line is to be coated) should also be placed along the right of way. It is also good practice to place all the material such as drips, valves, couplings, etc., just as soon as possible as lack of material can easily increase the construction costs of a line by delaying and holding up the work.

Where compressed acetylene is used this can be distributed each day with the oxygen as it is not good practice to allow the cylinders full of compressed gas to lay around promiscuously.

As soon as the pipe is strung far enough along the right of way to permit, the "setting up gang" can be started. This gang consists of a foreman, one welder and enough men to conveniently handle the pipe. It is their duty to take the pipe, line it up on skids or roller blocks and tack weld the lengths together. Up to six or seven lengths are thus tack-welded together, depending on the contour of the ground and the driveway and road crossings.

This gang is immediately followed by the "firing line gang." This gang is composed of five or six welders, a like number of welder's helpers, and a foreman. When the welders are all set and ready, the lengths that have been previously tack-welded together are revolved, all the welds are made simultaneously, the welders always working on the top of the pipe. Each welder as he completes a weld should stamp it with his number so that at any time it can be definitely ascertained who made a certain weld.

When these long stretches have been welded together the ends are stopped by means of plugs or test heads and the section pumped up to ninety pounds per square inch of air pressure, this being the maximum pressure that can be obtained from a single stage construction compressor. This pressure is allowed to stand for an appreciable length of time and all joints tested with soapy water. Any of the welds that show up leaking are fixed up by welding and a record made of just which welders made these welds. Only a few leaky welds in succession is sufficient cause to dispense with the services of the welder responsible for them.

Later when these long stretches are joined together and the line lowered into the ditch, the stationary welds are not backfilled until the line has been pumped up to pressure between valves and these joints proved tight.

All of this testing is done by means of a portable compressor, an operator and a helper. Where lines are laid adjacent to highways we have found it reduces costs to use compressors mounted on trucks for this service.

This testing is not done with any idea of testing the strength of the joints. It is done to test the gas tightness of the joints only. Thus, regardless of the pressure that is to be ultimately used on the line ninety pounds per square inch is ample pressure for this test as a joint that is gas tight at ninety pounds per square inch pressure will be gas tight at any pressure.

Following the testing comes the "Tying-in Gang." This gang is composed of one welder and two or three helpers. By means of a tractor or winch on a truck, they drag the long stretches of pipe together, line up the ends and dig out under the pipe so that the welder will have room enough to make the weld which has to be done while the pipe remains stationary. Only the very best welder should be used on these stationary welds.

All of the welding should be in charge of a competent welding foreman who is himself an expert welder and can follow the men up to see that their welding is good, that full penetration is obtained and that the procedure is correct. It is also good practice to cut out a weld occasionally and have it pulled so as to see that the full wall strength of the pipe is being developed.

If the line is to be coated in the field the "Coating Gang" follows the "Tying-in Gang." The procedure depends upon the kind of coating that is used but in all cases the coating should be watched very carefully for unless a good coating job is secured the money that is spent for coating is wasted. In using hot coating care must be taken to see that the material is at the proper temperature. If the pipe is being wrapped in the field the felt must be applied at the proper tension to cause the mopping to squeeze out and to prevent any bubbles forming between the felt and the pipe.

If the coating is applied some time in advance of when the pipe is lowered into the trench and the sun during the day is hot, it is good practice to whitewash the pipe. This whitewash keeps the coating from getting hot enough to run.

Competent Foreman Necessary

The coating gang should also be in charge of a competent foreman who knows just how the coating being used should be applied. It is also a good plan to pay the laborers in the coating gang a little higher wages than other laborers on the job, as their work is harder and more specialized.

The "Coating Gang" is followed by the "Ditching Gang" with the ditching machine. These machines, of which there are several makes and kinds on the market, will dig successfully in all kinds of soil even small boulders and loose shale.

Where ledge rock or large boulders are encountered the ditcher has to be taken out and hand methods resorted to.

The bottom of the ditch should be clean and even so that the pipe may have a uniform bearing on solid earth. If this is done it is not necessary to place the pipe on blocking of any kind.

As fast as the ditch is opened the "Laying Gang" comes along and lowers the pipe into the ditch. When the pipe is not coated this operation is very simple as the pipe does not need to be handled with excessive care. With coated pipe, however, care has to be taken to see that the coating is not damaged in lowering the pipe into the ditch. To accomplish this pipe horses or tripods are used over the ditch and the pipe lowered with ropes using canvas slings around the pipe. With large sizes

of pipe chain blocks are sometimes used for this purpose, thus reducing the number of men necessary to handle the pipe.

The backfilling operation, immediately following the lowering of the pipe, and the final testing is a comparatively simple operation. In placing the first layers of backfill over the pipe care should be exercised, however, to see that no large stones fall on the pipe and puncture or damage the coating.

FIG·12

DIAMETERS	2"	4"	6"	8"	10"	12"
MATERIALS	0.216	0.480	0.747	1.000	1.250	1.750
LABOR	0.280	0.350	0.433	0.450	0.580	1.000
EQUIPMENT	0.170	0.170	0.170	0.170	0.170	0.500
AV. TOTAL COST.	0.666	1.000	1.350	1.620	2.000	3.250

NOTE:
—The above prices include coating.—

·COST PER LINEAL FOOT·
—WELDED STEEL MAINS—

The backfilling may be accomplished by using any of the commercial backfillers on the market. These are of the dragline push boom or bull-dozer type.

In laying pipe along highways the backfill should be placed in layers and mechanically tamped. By using a good mechanical tamper this does not materially increase the cost of the work. After the backfilling is completed the fill should be allowed to settle and then be shaped up and the shoulders of the road regraded. Nothing creates a poorer impression in the minds of the public than a backfilled pipe line trench along a main highway that has been left in a sloppy condition.

Of course, when a line is laid along a private right of way the ditch does not have to be tamped and trimmed up after backfilling.

Precautions Against Foreign Matter

It is, of course, impossible to build a pipe line of any length and size that upon its completion will be 100% free from dirt, small stones and similar foreign matter. As any foreign matter of this kind is liable to be a source of trouble in the operation of a line, great care should be exercised in the construction to see that as little foreign matter as possible gets into the pipe.

To accomplish this a number of precautionary steps should be taken:

1—Each length of pipe when it is being lined up should have a wire circular swab brush passed through it to assure its being clear and free from obstructions.

2—As soon as two or more lengths of pipe are welded together and are to be left until the tying-in gang comes along the open ends should be securely covered with wooden plugs, burlap bags, or tin plates. This prevents small animals from getting into the line.

3—A length or stretch of pipe should never be dragged along the ground unless the end is tightly covered.

When the line is completed and the section blown up with air for testing this pressure should be relieved by blowing in one direction, which procedure will blow out most of the dust and small pebbles that get in the line in spite of all precautions taken. This blowing should be done through as large an opening as possible.

In Figure 12 is a table showing average costs per foot of welded steel pipe lines in the United States for sizes 2" to 12" inclusive. These figures include average amounts of rock excavation and can be used in estimating. The actual estimated cost of any line should, however, be made up after the right of way has been decided upon and actual conditions taken into consideration.

Valuable Products From Natural-Gas

THE treatment of natural gas by pyrolysis, or decomposition at high temperatures, for the purpose of obtaining various commercial products, has recently received considerable attention in this country and in Europe. A study of the matter is being made by the United States Bureau of Mines, Department of Commerce, and the State of Oklahoma at the Petroleum Experiment Station, Bartlesville, Okla.

When methane is subjected to temperatures of 1800 to 2200 degrees Fahrenheit it breaks up or "cracks." At slightly lower temperatures the parts reunite, but form new products as they combine. The higher hydrocarbon gases also break up and reunite to give various products different from the parent substances. At sufficiently high temperatures the gases will decompose to carbon and hydrogen.

In either type of cracking, hydrogen is always set free and by suitable means can be isolated and used commercially. Its major uses are as a reducing agent in the process industries, the hydrogenation of mineral and vegetable oils and coal; the synthetic production of ammonia and fertilizers; and as a refrigerant.

Other gases formed in the pyrolysis of natural gas are acetylene, butadiene, ethylene, propylene and butylene. Acetylene is used in welding and cutting metal; and may be used to prepare acetahdehyde, which is further used in silvering mirrors or in the preparation of medicinals such as chloral, a soporific. Butadiene, under proper treatment, condenses to form an artificial rubber having the same general composition as natural rubber. Ethylene has recently come into use in ripening fruits. It is also finding use as an anesthetic. However, its major use at present is the synthesis of ethylene glycol, an anti-freeze for water cooled motors, and the basis for a series of important lacquer solvents. If desired, ethylene may be converted to ethyl alcohol, widely used as a solvent, also in the preparation of other compounds such as ether. Again by the proper reaction with chlorine, ethylene chloride is formed. This is a valuable solvent, especially for fats and essential oils, and is also used as an anesthetic. Propylene finds use as an anesthetic, and also in the synthesis of Iso-propyl alcohol, which is being substituted for ethyl alcohol with good results in certain instances. Butylene is also used in the preparation of certain butyl alcohols which are finding use as solvents in the chemical industries.

The principal liquids formed in the pyrolysis of hydrocarbon gases are benzene, toluene and xylene.

The solids resulting from pyrolysis are chiefly naphthalene and anthracene. Naphthalene is well known as an insecticide in the form of moth balls. It is also the basis for the important indigo dyes. Anthracene is used in the synthesis of alizarin dyestuffs. Finally, under certain conditions of cracking, there is obtained carbon black, widely used in making ink, in compounding rubber, and as a pigment for paint.

Natural Gas and Its Future in the South

EDGAR G. HILL

Vice-President and General Manager, Southern Natural Gas Corporation

NATURAL gas is the ideal fuel. It brings to the consumer heat units in the most effectively utilizable form, and at a price permitting its use, not on a luxury basis, but generally by the people in their homes, and by industries as well, on a genuinely competitive basis compared with other forms of energy. In this respect, at least, it is different from the manufactured gas with which most of you have been identified.

The rapidly growing sales of natural gas, even in sections where competition of other fuels is keen, proves this statement of mine, I think, beyond question.

In the home natural gas is sold at rates for cooking and also for hot water heating, that are highly attractive. Many of you have been disturbed by the increasing inroads made by the electric power companies on your cooking load. Natural gas is your way out. There are only 3413 BTU in a kilowatt of electric energy. A thousand cubic feet of natural gas contains approximately one million BTU. Simple arithmetic shows that 293 K.W. are therefore required to furnish the heat units which in natural gas are usually sold for not over two dollars and a quarter, including the service charge for the first thousand feet. Assuming equal efficiency in the appliance, electric current must be sold for a minimum of something less than eight mills per kilowatt hour to compete with even the first 1,000 cubic feet of natural gas. With manufactured gas of 550 BTU per cubic foot, selling at the same price including the service charge, electricity at one and one-half cents per K.W. hour is competitive on a heat unit basis.

Ridiculous Statements

Ridiculous statements of the increased efficiency of electric over gas-burning appliances are often made, which have undoubtedly had weight in building the electric cooking load at the expense of the gas company, but today the gas appliance industry offers you ranges of high efficiency, including the insulated oven and thermostatic control, which have been the main talking points of the electric salesman. Undoubtedly some antiquated and poorly adjusted manufactured gas ranges have been replaced by electric stoves to the advantage of the householder, especially as the electric company's service charge is brought forward as applying also to current for lighting and so a necessary expense in any event, which is usually the case. The cost comparison which I have just made assumes that all cooking will be done with the first thousand cubic feet of gas, the price of which includes the usual service charge. This is not always true.

A large family will use more than this first thousand feet for cooking, securing the second and third thousands at prices usually about half that of the first thousand, in which case, the saving by the use of natural gas becomes still more obvious.

When we come to domestic water heating, we find a field of service in which natural gas stands almost alone. The modern natural gas fired automatic storage water heater is in a class by itself from every standpoint. Durable, reliable, operating at low cost, it is the modern family's most valuable servant. It has largely replaced the old-fashioned coal type heater, which gave trouble in many localities due to scale from hard water forming in the coil, and modern production methods have brought the price within reach of all.

Finally we come to what is to my way of thinking, the most beneficial domestic use of natural gas, both from the standpoint of the consumer and the utility. If I seem unduly enthusiastic over this phase of the business, remember that I have heated my home with gas wherever I had the opportunity, and my father's home before me, was so heated. I have burned natural gas in my furnace in Edmonton, Alberta, Canada, where temperatures of 40 degrees below zero were common, and am now burning coke oven gas in my present residence in Birmingham, where natural gas is at present sold by my company for industrial use only.

Making a Fast Friend

It is the purpose of my company to sell natural gas at a price which will permit its general use for house heating. Once a consumer heats his house with natural gas, burned either in a modern, well designed conversion unit in his old furnace, or better still, in a furnace designed for gas, and is given good service by the utility at reasonable rates, he becomes that utility's greatest asset, a lifelong friend.

In offering natural gas for this service, the utility must first make sure that its distribution plant, service lines and meters are adequate to handle the load. It must then push the sale of its commodity vigorously, truthfully and fearlessly, using intelligent, trained men only, and sell and install only apparatus of proven merit and high efficiency.

Before coming to the Southeast, I was in charge of the operation of the pipe line system which supplies

Abstract of Paper presented at Meeting of Southern Gas Assn., Savannoh, Ga., June 10-13, 1930.

Texas natural gas to Pueblo and Denver, Colorado. The system was completed and the first natural gas deliveries made to those cities in June, 1928. As an illustration of what can be accomplished by intelligent, aggressive salesmanship, reinforced by a policy of reasonable rates and dependable service, I can give you these figures: In January, 1927, before natural gas was available, 417 buildings in Denver were heated with gas. In January, 1930, 18 months after natural gas was turned into the Denver mains, there were 7,713 heating installations in that city, where a good grade of domestic lignite coal sells for $5.00 to $6.00 per ton, delivered to the domestic user. In Pueblo, there were 7 gas heating installations in January, 1927, and 1,390 in January, 1930.

In Dallas, Houston and Fort Worth, Texas, the use of natural gas for domestic and commercial heating is well nigh universal, with gas selling at about 5 cents per 1,000 cubic feet for this purpose. These facts, I think are almost unanswerable. If natural gas is made available for house heating at reasonable rates and properly served, the people of the United States will use it, in spite of all the efforts of dealers in competing fuels. Not only will they use it, but they will pay up to 75 cents per thousand cubic feet for it, almost regardless of coal prices.

Competitors will shout from the housetops that natural gas for househeating is not economical, and that people will almost bankrupt themselves through its use. To such arguments, the best answer is a steady, intelligent sales campaign to secure business, and that business once secured, a policy of dependable service. Your house-heating customers then become your most effective salesmen.

The Answer

Why do people like to heat their homes with natural gas? The answer is easy. Quick heat available at the turn of a valve, or the click of a thermostat, no soot or dirt from solid or liquid fuels or from ashes, no furnace tender, tramping into and out of the house at unseasonable hours, lowered laundry and cleaning bills, no storage of fuel necessary, and additional room available in the basement, which was formerly occupied by competitive fuel.

Granting for the moment that the cost of natural gas fuel is sometimes greater than solid fuel, it must be a fact that these other advantages and savings overbalance the extra cost of the fuel alone, or else people simply would not heat with gas.

Fuel oil is sometimes mentioned as a competitor for househeating. We in the natural gas business do not give it such recognition, because it offers no advantages, and is hopelessly at a disadvantage from a cost standpoint, both as to the fuel itself and the equipment required to store and burn it.

Now as to the other, great field for this commodity, its uses in industry, there are two general industrial spheres where natural gas is almost invaluable, in the steel business and in the ceramic industry generally. Natural gas for special process work in steel is selling in Ohio and Pennsylvania at almost domestic prices. It is sold in great quantities at lower prices for fuel in open hearth furnaces and soaking pits. At Birmingham, the great plants of the Tennessee Coal, Iron and Railroad Company, under normal business conditions, use far more natural gas than the whole city of Atlanta.

Brick and tile manufacturers eagerly await natural gas, as it is an ideal fuel for their needs, its use resulting in a better product, with less spoilage, at generally a lower cost per thousand. The lime kiln operator finds that he can produce better lime at lower cost with natural gas, even in the Birmingham district, than he was able to turn out before natural gas was available.

As a boiler fuel, natural gas, while ideal, must be sold at lower rates than it commands in other industrial fields. My company is selling it for this use, but only until such time as the domestic load builds up to a point where the further sale of boiler gas would imperil domestic service. When that point is reached, we will stop selling boiler gas except on an off-peak basis in the summer months.

In closing, an expression as to the life of gas fields and continuity of supply may not be out of place. My company has firm contracts with the producers controlling the greater part of the Monroe and Richland gas fields, these contracts running until 1950. Recent developments in Mississippi indicate commercial gas areas in that state, how large we do not yet know. The Monroe Field was well developed before the Richland area, only 15 miles away, was discovered.

It has been the history of the natural gas business that no major gas producing area has yet been completely exhausted. Fields in Pennsylvania are still producing after over 40 years of service. We look to the future of our business with confidence.

Bettering Public Relations

SOUND public relations are as worth cultivating by a business concern as it is worthwhile for an individual to have a good reputation in this world. For this reason the public relations man of a company should report directly to the President, or to the Vice President. He should hold so important a place that he can sit in on all important conferences where matters of company policy are decided. He should be constantly informed by the President as to what is going on within the business. At times he may be able to make a suggestion that will save the company from a serious blunder. He must know the reactions toward the company of people who buy the company's products. He must not be a part of the advertising department, but he must be in the position to advise the advertising department since one of the functions of advertising is the creation of good will.

While the responsibility for public relations should be centered within a single department in a company, yet the entire company should take part in the public relations program, and should feed significant information to the public relations department.

Not only should every company have a full time public relations executive, but if it can afford to do so it should employ the services of a public relations counselor to secure an outside point of view.

The public relations man who understands the facts should make them known as quickly as possible if he has the good of the company at heart. He frequently reports not only what has happened in the past but events to come and future activities of the company since these have good news value.

—From an address by David Lawrence before American Management Assn., New York City.

Liquefied Petroleum Gases

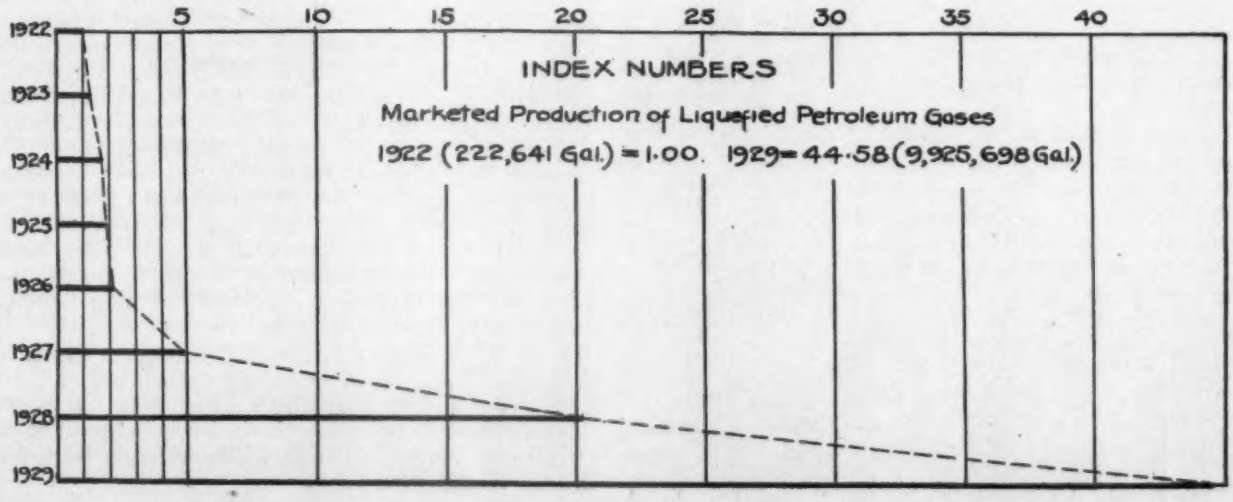
Typical Butane plant recently put into service in Moorpark, California, and designed to care for 200 customers; said to be the world's smallest gas plant

MARKETED production of liquefied petroleum gases during 1929 reached a total of 9,925,698 gallons, an increase of 120 per cent over the 4,522,899 gallons marketed during 1928, according to the United States Bureau of Mines, Department of Commerce, following the completion of a survey conducted by E. B. Swanson, Acting Chief Petroleum Economist, through which the first quantitative data on this recent development in the petroleum industry have been assembled. Information received from representative producers regarding shipments during the first five months of 1930 indicates that the rate of growth established during 1929 is being continued. Of the 1929 distribution, 113,080 gallons were shipped outside the United States, principally to Canada and the Hawaiian Islands.

The production of Pintsch gas, a compressed gas made by cracking oil and used principally as an illuminant; the manufacture of Blaugas, a liquefied petroleum gas made from gas oil; and the extraction and liquefaction on a relatively small scale of some of the lighter fractions of casinghead gasoline, constitute a background, extending over approximately half a century, for the recent developments in the commercial manufacture and sale of liquefied petroleum gases. In the present stage, the natural gasoline extracted from natural gas is the principal source of the lighter hydrocarbons suitable for liquefied petroleum gas manufacture, although the refinery gases resulting from various oil distillation processes constitute a potential source.

The need of petroleum refiners for more stable grades of natural gasoline necessitated the removal of more volatile fractions of the raw casinghead gasoline. This was accomplished originally by "weathering," in which the major portion of these volatile fractions was lost, but in recent years the use of fractionating columns for the separation of the fractions has permitted their recovery and utilization for domestic and industrial purposes. These lighter hydrocarbons occupy the intermediate zones between the so-called permanent gases and liquids. They remain in liquid form when under pressure but are gases at atmospheric pressure and normal temperatures. Consequently, they may be stored and transported as liquids under pressure in special cars, tanks, wagons, and cylinders and used as gases at atmospheric pressure. Propane and the butanes form the compounds in the liquefied petroleum gases now definitely established, but pentane, a liquid at average temperatures, was included in the survey to the extent that it is marketed for purposes similar to the two lighter fractions.

The record of the production of liquefied petroleum gases may be extended as far back as 1912, when Blau-



gas was established as a commercial product, but, as such a record would in part indicate the operations of individual companies, the record of marketed production is extended only through 1922, the period during which three or more companies were annually engaged.

The use of liquefied petroleum gas as a domestic fuel in territories not served by gas mains was the first important development in the use of the products. Propane, self-vaporizing at temperatures above minus 44° F. and with a heating value of approximately 2,500 B.t.u. per cubic foot, is most widely used for this purpose. In the two-drum system of service, two cylinders of fuel are installed in a special cabinet outside the customer's residence and the gas is piped through a regulator to the appliances. Upon the exhaustion of one cylinder, the second is turned on and the empty cylinder is returned to the bulk station to be re-charged. In the one-drum service, a single cylinder is furnished the customer. This cylinder is periodically charged from a service truck, the cylinder being weighed before and after charging, and the customer is billed for the actual amount of fuel used. Cylinders are of several different sizes—25, 35, 40, 50, 60, 88, 100 and 150 lbs.—but the more common sizes are 60 and 100 lbs.

A Large Increase

The number of customers served with "bottled gas" increased from about 20,000 in 1928 to approximately 55,000 in 1929, according to the reports submitted to the Bureau of Mines during the survey. Although all states were included in the national distribution of this fuel, the major portion of consumers were in the North Atlantic and North Central States, California, and the Southern States of the Atlantic seaboard. The price per lb. to the consumer in the Pacific Coast territory ranged from 9.5 to 10.5 cents, while east of the Rocky Mountains the price ranged from 11.3 to 14.5 cents per lb., according to the distance of the consumer from the source of supply.

Special attention has been given to the utilization of liquefied petroleum gases in conjunction with the gas industry, to replace gas oil in carburetting gases of relatively low thermal value to the required calorific standard; as a base material for manufactured gas; for the re-carburetion of gases to offset the loss of thermal value in high pressure transmission systems; to meet peak load conditions and as a protection against interruptions in service; and as a source of gas supply to communities which are not large enough to warrant the installation of manufactured gas plants or the extension of distribution systems from nearby centers. Propane, butane and pentane have been used for these purposes.

The first plant employing the butane-air carburetion process began operations at Linton, Ind. in June, 1920. By the close of 1929, similar plants were operating in Sheridan, Ind.; Calais, Me.; Watertown, S. D.; Maple-town, Iowa; Harrisonburg, Va.; North Manchester, Ind.; and Moorpark, Cal. At the end of May, 1930, additional plants were operating in Shenandoah, Iowa; Cleveland, Tenn.; Kerrville, Texas; Hendersonville, N. C.; Sheldon, Iowa; Harrisburg, Ill.; and Chadron, Nebr.; while similar plants were under construction in Clarinda, Iowa; Columbia, Tenn.; Maryville, Tenn.; Eldorado, Ill.; Murfreesboro, Tenn.; Onset, Mass.; Maryville, Mo.; Goodland, Kas.; Missouri Valley, Iowa; Bath, Me.; Moultrie, Ga.; Bemidji, Minn.; and Christholm, Minn. Plans for the extension of similar service to a number of communities in California have been announced. The experience gained in piping propane-vapor to small groups of houses has been applied to distribution systems for communities which are not suitable for the profitable operation of butane-air carburetion plants.

Liquefied petroleum gases also have been applied to a number of industrial purposes. Several industrial plants have installed butane storage equipment as a standby to guard against the interruption of their normal fuel supply. Propane is being used as a fuel to heat the absorbers in iceless automatic refrigeration cars and its use in a somewhat similar way for cooling railroad passenger cars has been suggested. In the metal and allied industries, liquefied gases are being used for heat treating, hardening, annealing, gas carburizing, enameling, core baking, metal cutting, forging and similar operations. In commercial laundries, these gases are used for operating collar and cuff pressing machines, mangles, hand irons and washing machines, while in the food industries, they have been applied to the canning of milk, fruits and vegetables and the roasting of coffee and peanuts.

In school, industrial and hospital laboratories, propane is being used for operating burners, hot plates and sterilizers and, in industrial plants, for heating soldering irons, bench furnaces, for heat treating small tools and for the melting of soft metals, such as copper, brass, bronze and lead. Other industrial applications include glass annealing and the burning of ceramic ware; for singeing, drying and heating calender rolls in textile mills; for heating type-melting pots in printing plants; glass blowing and working; carbonizing radio tube plates; lead burning and the production of distilled water at battery service stations; as a refrigerant in gas-fired refrigerators; for pilot lights on oil and pulverized coal burners; for paint burning; for incubator heating and egg candling; pre-heating for welding; and the operation of heavy-duty cooking equipment in hotels, clubs, restaurants, road stands, dining cars and boats. The industrial application of these liquefied gases is being extended continually through experimental studies.

Companies Furnishing Data

In its survey of the liquefied petroleum gas industry, the Bureau of Mines received the complete cooperation of the following producers: Bradford Gasoline Company, Bradford, Pa.; Carbide and Carbon Chemicals Corp., 30 E. 42nd Street, N. Y.; Hope Construction & Refining Co., 545 William Penn Way, Pittsburgh, Pa.; Lone Star Gas Company, 1915 Wood St., Dallas, Texas; Mars Company, Oil City, Pa.; Northwestern Blaugas Co., St. Paul, Minn.; Philfuels Company, General Motors Bldg., Detroit, Mich.; Shell Oil Company, Shell Building, San Francisco, Cal.; Shell Petroleum Corp., Shell Bldg., St. Louis, Mo.; Skelly Oil Company, El Dorado, Kansas; Sloan and Zook Company, Kane, Pa.; Standard Gasoline Company, 225 Bush St., San Francisco, Cal.; and Viking Gasoline Corporation, Charleston, West Va.

A list of marketers of liquefied petroleum gases, including the location of main and branch offices, territory served and date on which distribution was begun, is available and copies may be had upon request to the Petroleum Economics Division, United States Bureau of Mines, Washington, D. C.

The Gas Producer

I—Continuous Producer

JOHN W. ROMIG

THE gas producer may be defined as an apparatus capable of transforming a solid fuel into a gaseous fuel. The fuels commonly used for transformation into producer gas are anthracite, semi-bituminous, bituminous and lignite coals, fuel oils, coke and coke breeze. The gas producer operation is similar with all kinds of fuels; however, producer adjustments must be studied and properly made for the fuel gasified. Any of the above fuels can be readily changed from a solid fuel state into a gaseous fuel. Resultant heat losses are balanced by greater ease of application of the gaseous fuel supplying heat for furnaces or processes. In many processes the application of a solid fuel is impractical and a liquid or gaseous fuel must be used and gratifying economic results can be obtained by gasifying a medium or low grade fuel. Producer gas, powdered fuel, natural gas, oil gas and fuel oil are adaptable to furnace and process work. Powdered fuel carries a large amount of ash and for this reason its use is limited in industrial plants to processes not affected by ash impurities. Some open hearth steel furnaces are now being operated with powdered coal as a fuel. Producer gas carries some fly ash, but the quantity is almost negligible and does not affect many industrial processes.

Design of First Producers

The first gas producers were of a very simple type, consisting of a vertically mounted cylindrical steel shell lined with firebrick, an opening being provided at the top for charging fuel, and an opening at the bottom for cinder removal. A third opening near the top and on the side of the cylinder provided an outlet for the discharge of gas. Grates were installed inside the shell near the bottom to hold the ash bed and to secure an even distribution of air through the fuel. The air was usually admitted by connecting a suction fan to the discharge, or by applying pressure underneath, the former being the more common method of supplying air without moisture other than that in the air. This type of producer is known as the simple carbon monoxide gas producer. Its operation on a continuous basis presented many difficulties, especially in the removal of ash or cinders and in maintaining a uniform fuel bed. The gas resulting from the carbon monoxide producer process being of rather low heat content together with the operating disadvantages and low gasification efficiency have caused it to be replaced by the water vapor gas producer. Fig. No. 1 shows in section a simple carbon-monoxide gas producer with gas suction connection.

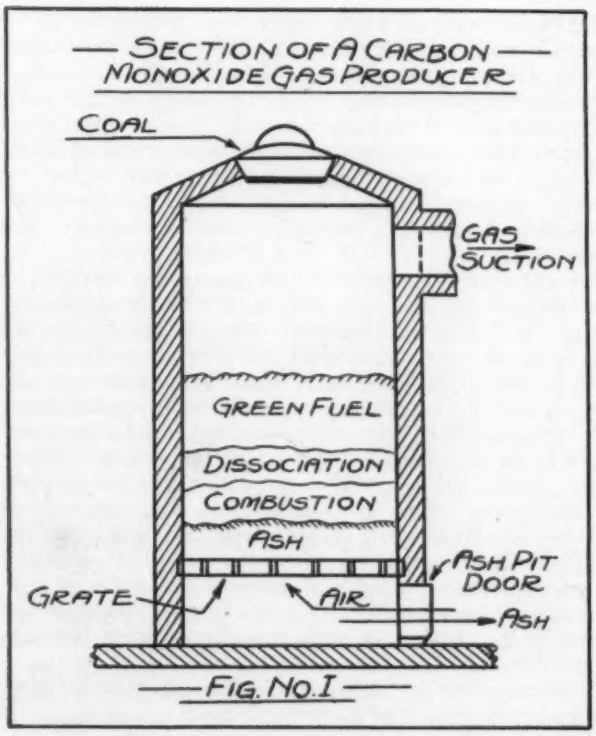


FIG. NO. I

The water vapor gas producer consists of a firebrick lined steel shell with provision in the top for fuel admission at one or more places, either by hand charging or by an automatic stoker and a gas discharge pipe connection about one-fourth the way down on the shell. The bottom is open in a water seal for the discharge of ash and clinkers. Water vapor (steam) and air are forced through a pipe ending underneath grates or tuyeres located inside the shell and just above the bottom of the shell. The lower portion of the shell is submerged a few inches under water in a water pan or basin to keep the gas from leaking out and wasting into the atmosphere, for as a rule a positive pressure exists inside the producer. The steam may be admitted through an orifice and set of venturi throats so as to induce and blow air along with the steam at a low pressure, usually from 1 to 4 inches water gauge through the grates and up through the contents within the producer shell. Another method of admitting air is to have a steam turbine driver blower so arranged that the blower suction takes air and the turbine steam discharge is mixed with the air taken into the blower; the vapor mixture is then discharged under the grates or tuyeres.

It does not matter greatly whether the air-steam mixture is admitted by means of a blower or through an injector; both schemes allow the admission of both air and water vapor to the producer and adjustments may be made independently to vary the quantities of air and water vapor. The water vapor producer, because of certain reactions discussed later, shows economic advantages in greater gasification efficiency and in addition, most of the fire bed ash and clinker removal troubles are eliminated or relieved to such an extent that either intermittent or continuous operation of the producer is practical.

Producers have been built and operated on the same general basis as the water vapor producer using carbon

dioxide instead of water vapor for cooling the combustion zone and for chemical dissociation of carbon dioxide into carbon monoxide and oxygen. Carbon dioxide forms an active oxidizing agent at high temperatures such as those encountered in a producer combustion zone. Only recently blast furnace gas of about 94 b.t.u. heat content and 10 to 14 percent carbon dioxide has been admitted to water vapor gas producers replacing steam with success, using both eastern and western fuels.

A gas similar to producer gas is formed directly by the destructive distillation of coal. The volatiles are driven off, the fixed carbon and ash remain in the charging retort forming coke. The quality of the gas and residual matter depends upon the process and the fuel used. Present type equipment is in service using the recognized coking coals although with the coals known as the non-coking variety, especially Illinois coals, successful destructive distillation has not reached a production basis for industry. The mechanical set-up is complicated in operation and costly to install so the adoption of destructive distillation equipment has been retarded. Sometimes a mixture of coking and non-coking fuels is found to give results in the form of gas and coke such that the process becomes profitable.

Summarizing the above, the following general types of gas producers have been developed:—

1. The Carbon Monoxide Gas Producer.
2. The Water Vapor Gas Producer.
3. The Carbon Dioxide Gas Producer.
4. The Destructive Distillation Gas Producer.

The second named type is that most commonly found in industrial plants, the first, third and fourth named are more rarely used in gasifying fuels for industrial processes.

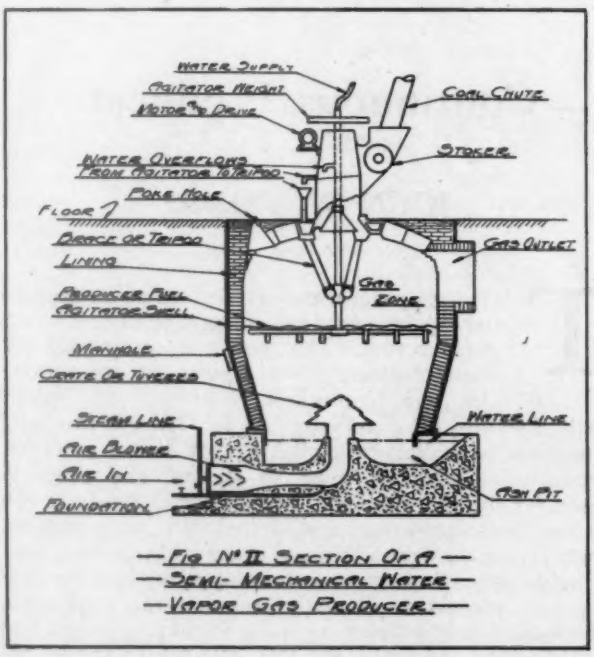
The water vapor gas producer has been selected by most industries for transforming solid fuels, principally anthracite, semi-bituminous and bituminous coals into a gaseous fuel-producer gas. The selection has been made because of the ease of maintaining continuous operation, because of the reasonable richness of the gas involved and because of the good overall thermal efficiency of the water vapor gas producer. It is reliable and can be depended upon for forcing to maintain peak gas requirements.

Pressure Type Producers

A great majority of industrial gas producers are of the pressure type, the steam-air mixture being forced through the grate and upward through the ash and fuel beds, the gas in the producer being under a slight pressure. In the case of most furnace installations, suction fans are not used to move the gas from the producer. However, where conduits are long, or where the gas must be washed, or if it must be forced under pressure into a receiver, suction fans or blowers are employed for boosting the pressure. When excessive gas pressures exist in a producer, gas leakage around stoking openings, poke holes, etc. becomes a source of waste and a nuisance.

Steam is required for the water vapor producer. Most industrial plants have a steam supply available and this feature seldom presents restrictions in the selection of gas producers. The steam pressure normally required for gas producers is under 100 pounds per square inch gauge at the producer, while the pressure actually used varies from 25 to 85 pounds per square inch gauge, depending upon the fuel, the fuel bed, the rate of gasification and the size of orifice or the turbine design, if a turbine is used to supply air.

Figure No. 2 shows the general arrangement of a common type of industrial water vapor producer. Fuel is usually stored in a bin over the producer, although in some of the older types of the hand fired variety fuel bins may be placed at the side of the producer so that



—FIG N°II SECTION OF A—
—SEMI-MECHANICAL WATER—
—VAPOR GAS PRODUCER—

shoveling is convenient. The fuel is charged into the top of the producer, either through charging doors or by means of an automatic fuel feed or stoker, and is distributed evenly on the bed in the producer by hand distribution or stoker action as the fuel is admitted.

The present design of gas producers is such that mechanical provision is usually made for agitating the fuel bed and to break up clinkers; some types have both top and bottom agitation. While such mechanical features are a great help in maintaining uniform fire conditions, they do not eliminate entirely hand work in breaking clinkers from the edges of the fire bed. Openings or poke holes are left in the crowns of all producers for observation and hand fire working. Mechanical ash removal equipment or plows have simplified ash removal in the case of some late types of producers.

Steam under pressure regulating valve control is admitted through an orifice or through a turbine and passed with the air, either induced or blown into a vapor pipe, to a point under grates or tuyeres which partially support the ash and fire beds. The air-steam mixture under a slight pressure passes through the contents of the producer. The gas leaves from the outlet in the side of the producer shell into mains or to suction fans. It may be scrubbed or washed and coal tars, ammonia, carbon and ash are removed, leaving a clean gas, or it may go directly to the process without cleaning. The latter course is usually followed for industrial furnaces, although chambers are often provided for decreasing the gas velocity so that solids are precipitated.

The installation of a modern gas producer of the water vapor type requires motive equipment for the stoker and ash plow, steam for the water vapor supply and a water supply for agitators. The water supply

should be free of scaling ingredients which form at temperatures lower than 125° Fahrenheit, for scale inside agitating or leveling apparatus will cause early failures of the apparatus with resultant outages of the producer equipment. Common makes of producers require from 5 to 15 gallons of water per minute, depending upon fire bed conditions, one-half to two and one-half brake horsepower for driving equipment, and from 150 to 3000 pounds of steam per hour depending upon the amount of fuel charged.

There are a number of practical gas producers on the market today and almost without exception they will give good gasification results. One important feature to observe in the purchase of producers is to buy from a firm of good financial standing, as repair parts for obsolete makes of producers are very difficult to obtain. Most of the parts require intricate pattern work, a costly procedure if an industrial concern is desirous of duplicating parts in local foundries. When considering producers for purchase, ruggedness of construction is a very important specification, as producers are subjected to corrosion, heat, dirt and heavy duty service, and must be able to perform under such conditions continuously for long periods of time. Simplicity is another item that requires study when selecting units for reliable performance.

Tests have shown that hand fired producers will give, with excellent attention, as good results as mechanically fired units. However, the mechanical type is perferable because it is almost impossible to get conscientious attendants, so in the end, with the usual run of "gas makers," they are the best investment.

There has been a tendency on the part of some manufacturers to specify producers which, when installed, have been too large for the quantity of fuel to be gasified. Before purchasing, it is essential to carefully analyze the heat requirements to be met. From this, the gasification rate in pounds of coal per hour per square foot of free producer area can be computed. A producer handling 12 to 15 pounds of fuel per square foot will usually be somewhat troublesome. Ratings of 18 pounds to 45 pounds of fuel per hour per square foot area are practical with some producers of modern design. A rating of 18 to 35 pounds gives good operation with most fuels and most producers. As a rule, consultation with disinterested producer engineers will prove profitable both from the viewpoint of operation and initial installation cost if producers are to be purchased.

The chemistry of the carbon monoxide gas producer, the carbon dioxide producer and the destructive distillation gas units will not be discussed, as their application in the industrial field is limited and indications at the present time do not warrant a resumé of the reactions involved. The reactions within the water vapor gas producer are of interest and should, in general, be known by those responsible for the operation of a gas producer department in an industrial plant.

(*To be continued*)

Advantages of Group Operation

THE advantages of group operation of public utilities under holding company management were pointed out by M. A. Morrison, vice president, Byllesby Engineering and Management Corporation, in an address to the accounting national section of the National Electric Light Association at San Francisco, June 17, 1930. Summing up, Mr. Morrison said:

"The economic advantages of public utility group management are chiefly secured through the application of basic, governing principles in about the following order:

1. Consolidation of several operating properties brings about an increased volume of business under one management.

2. Such consolidation enables the organization to concentrate production in large units, increase the utilization of plant, transmission and distribution capacity, and employ the services of the best administrative, financial, operating, construction, technical, purchasing, sales, publicity, advertising, and other specialists.

3. The work of these specialists brings two results: continually improved operating efficiency and increased volume of business which react upon each other to bring about improvement in service and decreases in its cost per unit. It is directly manifested in the development and standardization of the best methods of construction, operation, purchasing, rate making, valuation, accounting, sales, advertising, and other work.

4. Each consolidation increases the possibility for interconnection with other systems or groups, thus preventing duplication of facilities and realizing in full the advantage of quantity production, which is, in general, a better product at lower cost.

5. Due to the consolidation of properties, increase in earnings, economies in operation, and diversification of risks, the financial standing of the group is so increased that capital for refunding, extensions, and improvements can be obtained at much lower cost for the group than would be possible for any individual property standing alone."

Migration of Natural Gas From Injection Wells

AN investigation of the direction that natural gas migrates from injection wells is being conducted by engineers of the San Francisco field office of the United States Bureau of Mines, and some very interesting facts are being determined. From data collected it appears that gas migrates theoretically fan shape from the injection wells and that the angle of the fan depends upon the dip of the formation. In a level sand (90-degree dip) the gas migrates in all directions and the angle of the gas fan can be taken as 360 degrees. If the formation stands on end, (0-degree dip) the gas theoretically should go straight up and the angle of the gas fan would be 0 degrees. The data further show that the fan angle decreases as the slope of the formation increases. When the slope is about 30 degrees the fan angle is about 100 degrees and when the slope is 5 degrees the fan angle is 190 degrees. This information should be of real value in locating injection wells particularly in California, where many oil structures have steep slopes.

Built-In and Attached Producers

F. J. KENNEDY

West Gas Improvement Company, New York City

THE first producers used in the gas industry were a development of the direct fired system and were used in connection with horizontal retort settings. They were of the built-in type, with horizontal grates as shown in Figure 1, and were usually operated with natural draft. Although they gave much better results than did direct firing, there were a number of objections. Their dimensions were definitely limited by the dimensions of the setting so that they were always made rectangular

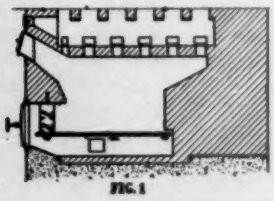


Fig. 1—Built-in Producer with Horizontal Grate,

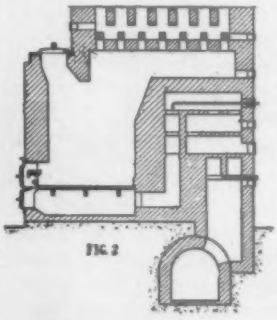


Fig. 2—Attached Producer

in shape, the length being almost twice as great as the width. Because of the limited space available, it was frequently impossible to provide sufficient grate and fuel area and the necessity of operating at high rates of combustion resulted in serious clinker formation. With this type of producer it was difficult to keep the fuel bed level and, at the same time, to keep it at sufficient depth throughout to prevent the formation of blow-holes. The cooling water which was introduced at the front of the grates was almost entirely evaporated before it reached the back, and this led to the formation of clinkers on the rear wall. The producers were clinkered by inserting false grates above the ash zone and by removing the clinkers, either through a clinker door or by dropping them into the ash pit after having removed the regular grate bars. The false grates were then removed and the fuel bed allowed to settle. During this clinkering process, and for quite a period afterwards, the operation of the producers was entirely upset. This resulted in variations in the quantity and quality of the gas produced. Built-in producers had the advantage of exposing only a small wall area to the atmosphere, so that the loss of heat by radiation was very small. They were economical in construction and required no extra ground space beyond the bench.

The next development in producer construction was the semi-extended type which partially projected from the main setting. It was more accessible and permitted easier charging and leveling of the fuel. Both it and the built-in types were charged with hot coke pushed directly from the retorts. A modern design of this type is shown in Figure 3.

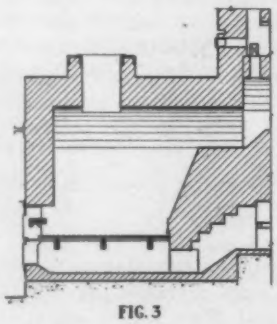
Abstract of a paper read at Joint Production and Chemical Conference, A. G. A., Cleveland, Ohio, May 21-23, 1930.

With the introduction of the attached producer, it was possible to improve the design considerably. The more modern producers of this type, Figure 4, have eliminated practically all of the difficulties encountered with the older types. This attached producer is equipped with water-cooled step grates, curtain walls, and may be operated with either natural or forced draft.

The step grate, which was originally developed to permit the utilization of low grade fuel, has proved decidedly successful in decreasing clinker formation and has greatly simplified the cleaning of the fire. Water is supplied to the top grate and flows by gravity to each successive grate. On its journey from step to step most of it is evaporated and passes through the fuel bed. In the larger producers a supplementary water supply is introduced midway. The water thus performs the double service of cooling the grate bars and of furnishing steam to keep the fuel bed at a temperature sufficiently low to prevent clinker formation.

The curtain wall is an important part of modern producer design. It will be noted from Figure 2 that as long as the producer is kept filled above the curtain wall, the effective fuel bed depth will be constant, regardless of the actual depth of fuel in the charging chamber. This design makes frequent charging unnecessary, and also eliminates the necessity of leveling the top of the fuel bed after charging.

The ash pit is provided with an open front, which permits pricking or cleaning the fire without introducing a greatly increased amount of primary air, as is the case with the closed ash pit construction.



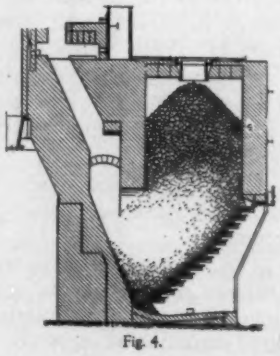


Fig. 3—Semi-extended Producer. *Fig. 4—Modern Attached Producer*

The locating of the producer external to the main setting has made possible a larger grate area and a more desirable shape. In some cases, the grate areas of modern producers are more than twice the area of the older types designed for the same service. This increase has had a very beneficial effect in reducing fuel consumption and clinker formation.

Some of the more important factors to be considered in the design of attached producers as regards adaptation for retort heating are as follows:

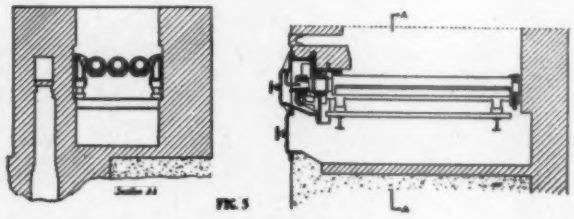
The producer must be proportioned so that the fuel bed may ke kept sufficiently deep, and so that the effective depth may be kept as constant as possible.

It must be proportioned so that the combustion zone may be maintained in proper form without undue labor.

The charging door must be so located as to permit easy charging.

The arrangement should be such as to permit removal of ash without difficulty and without undue disturbance of the operation of the producer.

The area and volume of the combustion zone must be sufficiently large to avoid high rates of combustion, with the consequent high temperature of the fuel bed and serious clinker formation. On the other hand, the combustion zone must not be so large that the temperature of the fuel bed will fall below the point of rapid reduction of the carbon dioxide to carbon monoxide.



Typical Shaking Grate

In the design of a producer too much importance cannot be attached to the selection of the grate. This part of the construction has been a stumbling block for designers in numerous cases.

Stationary and Shaking Grates

The more common type of grate is stationary and is merely a metallic grill, consisting of a series of notched bearer (or supporting) bars, upon which are laid a number of horizontal grate bars. The front end of such a grate is usually provided with some form of baffle or dead plate to hold the ash and fuel on the grate and to keep it from falling into the ash door opening.

A type of stationary grate which is receiving attention at the present time is the step-grate. This consists of a series of flat bars, placed horizontally across the ash door opening and arranged in tiers forming steps, the lower plates being set further into the fire box than the upper plate.

Shaking grates, both hand and power driven, have been applied to attached producers with varying degrees of success, but their adoption has not become general. There have been a number of failures of this type of grate, some of which have been due to poor mechanical arrangement, misapplication of primary draft overheating, use of fuel for which the grate had not been designed, and improper condition. These shaking grates have been of various types, including moving segments supported on rocker arms actuated by hand or power driven levers, flat cast iron segments individually moveable, and hollow perforated tubes set in bearings and partially revolved at intervals. Two examples are shown in Figures 5 and 6.

Cooling means have been applied to practically all types of grates and usually consist of the maintenance of water in the ash pan under the grate, or of the application of water directly to the grate bars. Steam is used to a very large extent because of its cooling effect and advantageous use in the primary draft mixture.

Factors in Grate Design

The design of a grate should be decided by the type of fuel to be consumed and its application should be based on the shape and location of the producer. There has been considerable discussion on the subject of grate area and it is questionable whether the capacity of a producer should be based upon the number of pounds of fuel which may be burned per hour on a square foot of grate. There are many considerations other than grate area which will affect producer capacity.

It is important to consider the relation between the grate area and the shape and volume of the fuel in the combustion zone; the grate must be shaped in such a way and have an area sufficient to permit a steady and uniformly distributed flow of primary draft to the combusting fuel. The grate arrangement should be such that it is easily accessible; ash doors, if used, should open the full width of the grate and be arranged so that those parts of the grate which are liable to damage or wear may be replaced during operation.

Wall Construction

The walls of the producer should be straight and without projections which would permit adherence of clinkers to the wall surfaces. The ratio of wall surface to grate area may be kept low by maintaining the cross-section of the producer approximately square. With some fuels this point is important.

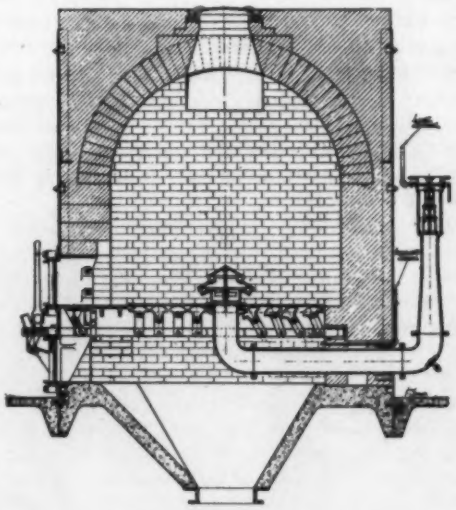


FIG. 6

Example of Shaking Grate

The lining wall should be built separately from the main body of the setting, so that it may be removed without affecting the stability of the structure, but, if this is not practical, as in the case of some built-in and semi-extended types, the masonry bond between the lining and the outer walls should permit the inner wall to be safely removed in sections. It is common practice to build the linings of "headers," but the bond of a wall built of "headers" is weak. It is liable to leakage and must be strongly backed up by well supported outer walls. It is generally good practice to use hard-burned fire brick in the lining walls, but much depends upon the nature of the clay used in the brick for some clays resist slags better than others. It is particularly important that the brick used in the lining wall should have but little, if any, shrinkage. Although hard burning tends to remove shrinkage during manufacture, it alone does not necessarily adapt the brick for the fire-face of the wall.

There are two systems of primary draft application—

natural and forced. Some form of positive control should be provided for the primary draft mixture. If the producer is operated on natural draft, the grate may be open to atmosphere. In this case, the dampers controlling the outlet from the heating system to the chimney will regulate the amount of primary air drawn into the producer. The bottom of the producer may be closed, and dampered ports provided for controlling the inlet of primary draft. Primary draft inlets may be connected to some means of forced draft whereby pressure above atmosphere is provided at the grate.

The primary draft may consist of air, air and steam, air and products of combustion, or air together with the steam and the products of combustion. The selection of the primary draft and the draft means (natural or forced) should be based upon the fuel.

Operation of Attached Producers

The simplicity of the operation of modern attached producers is one of the chief reasons for their continued use.

Fuel may be charged directly from the retorts—usually the case with horizontal retort settings—from an overhead bin located above the producers, or by means of charging larries. In general, no leveling of the fuel bed is required with fully extended producers, but with the semi-extended and built-in types, it is usually necessary to push the fuel toward the back of the fire to prevent the formation of thin spots and blow-holes in the fuel body. The frequency of charging varies with the design of the producer and depends on the amount of coke storage space. In some of the modern types the storage is sufficient to provide for charging only once every twenty-four hours.

The development of the step grate has almost entirely eliminated the formation of extensive clinkers, and the location of the producers external to the main settings provides ample working space for the firemen. The frequency of ash removal varies with the rate of firing and the type of fuel used. However, it is customary to remove the ash once every twenty-four hours and to prick the fire every eight hours.

A schedule of the average time required by one operator for attention to all four attached step grate producers of the type shown in Figure 2 at an Eastern gas plant with continuous vertical retorts is as follows:

Filling Producers	80 mins. per 24 hours
Cleaning Grates and removal of ashes 4 producers	330 mins. per 24 hours

The above time is a result of actual observations of three successive eight-hour shifts, during which the same operators also attended to the coke discharging from the whole plant, which produced more than a million cubic feet daily.

At another plant, equipped with horizontal ovens, and fired with five fully extended producers which use primary draft mixture of air, steam, and waste products of combustion, the total time given by one man to cleaning the five producers is three hours per day. No false bars are used. In this plant there is no daily clinker trouble, but each producer is shut down once in six months so that the side wall may be scraped clean. The fuel in this case is a mixture of nut and stove size coke, charged at three hour intervals.

Usually, attached producers are fired with run-of-retort coke or with screened coke of the larger sizes. They have, however, been fired successfully with the smaller sizes of coke.

Coal is often used in these producers with some success. It is more difficult to manage than coke, and more frequent cleaning of nostrils and flues is necessary, but when properly fired, it will maintain even heats in the setting at approximately the same rate of fuel consumption per ton of coal carbonized as with coke. Different draft adjustments are required for the various sizes and kinds of fuels.

Test Results on Attached Producers

Results of several tests on producers of the type shown in Figure 2 are available, and these are given in the heat balances below:

Input	**Percentages of Total Heat**		
	Test No.		
	1	2	3
Sensible heat of dry coke	0.0	0.0	0.0
Sensible heat of moisture in coke	0.0	0.0	0.0
Heat of combustion of dry coke	99.4	99.5	99.5
Sensible heat of dry air	0.1	0.1	0.1
Total heat of air humidity	0.5	0.4	0.4
Sensible heat of cooling water	0.0	0.0	0.0
	100.0	100.0	100.0
Output			
Sensible heat of producer gas	17.6	16.6	16.1
Latent heat of producer gas humidity	2.8	3.1	2.6
Heat of combustion of dry producer gas	75.1	77.0	77.9
Sensible heat of dry cinder	0.0	0.0	0.0
Heat of combustion of combustible in cinder	0.8	1.1	0.5
Radiation and convection loss	1.7	2.0	1.7
Unmeasured heat loss	2.0	0.3	1.2
	100.0	100.0	100.0
Heating value of producer gas B. t. u. / cu. ft. at 30″ 60 degrees dry	117.1	120.2	123.8
Cubic feet of gas at 30″ 60 degrees dry per lb. of coke charged	83.2	85.0	84.0
Temperature of producer gas F	1375	1274	1283
Per cent combustible in cinder	11.6	13.0	11.3
Producer Gas Analysis			
CO_2	3.3	4.4	5.5
O_2	0.8	0.3	0.1
CO	29.8	28.6	28.1
CH_4	0.5	0.6	0.8
H_2	4.8	6.5	7.8
N_2	60.8	59.6	57.8

Each of these tests covers a week's operation. During this time the producers were fired with nut coke made from Elkhorn coal. This coke contained about 6% moisture.

Some idea of the constancy of operation is obtained from an inspection of the producer gas analysis for each day of the test as given on page 57.

One of the principal points brought out by these tests, and an exceedingly important one, is the high heat efficiency of the attached producer. The heat efficiencies of the producers during these three tests, not including the latent heat of vaporization of the moisture in the gas, are respectively: 93.2%, 93.9% and 94.4%. It should be noticed that the losses due to the combustible in cinder are very low, as are the radiation losses, and that there is no loss of heat to cooling water.

Comparison of Attached and Central Producers

It is difficult to make a direct comparison of attached and central producers since each has its field of application. Unless the specific conditions are known, it is impossible to recommend one type in preference to the other. Certain generalizations may be made, however,

(*Continued on page 57*)

Welding in the Gas Plant

Extensive Plant Additions and Repairs Effected By Gas Company Through Use of the Oxy-Acetylene Process

GREAT expansion in the gas industry has resulted from the public demand for gas as a fuel in communities large and small. In order to meet this demand one public utility company serving several medium-sized communities recently interconnected all of these towns by means of oxwelded high-pressure transmission lines so that all gas could be distributed from one plant. The assurance of increased gas consumption necessitated doubling the capacity of the producing plant and providing for new branches to render service to many new users.

Fig. 1—Fabricating pipe bends

The problem of plant maintenance and making joints in piping installations had for some time past been successfully handled by this company's very efficient gas line organization through the use of the oxy-acetylene process. Procedure control welding is their standard practice. In their recent plant expansion, the contractor who did part of the work also conformed to procedure control requirements in welding.

Oxwelded piping is particularly adapted to gas plant installations. A great deal of complicated work was involved in the plant in question, including the erection of a new generator house to provide a much larger supply of gas. Carefully prepared templets were required in the fabrication of the various pipe bends shown in Fig. 1. The smaller piece of pipe, standing on end at the right, has been tack-welded to align the various sections for final welding.

In piping the gas from the purifier to a newly constructed gas bell, it was necessary to construct a 24-in. gas main, welded throughout, to circumvent an old gas bell. Fig. 2 shows how this was accomplished by oxwelding. By cutting the pipe according to templets, the bend was made with a series of four welds as shown in the illustration. A smaller oxwelded steam line was also laid adjacent to the 24-in. main.

All of the gas lines previously mentioned are used under low pressure. From the holders the gas is forced by a booster station to a pressure of about 60 lb. per sq. in., into a Hortonsphere, from which it enters the long distance transmission mains. Van Stone flanges were welded to the piping, and the tee connections were also welded.

One of the important steps in this plant expansion was the construction of a new booster station. Fig. 3 shows the oxwelded gas header where the low pressure gas is piped into the station and into the compressor. Underneath the compressor, a system of piping, not shown in the illustration, conducts the high-pressure gas to the Hortonsphere.

Fig. 2—Welded offset around old gas holder

In addition to the intricate gas piping installation, an entire new system of steam piping was also constructed to provide for the necessarily increased steam facilities in the development. An elevated steam piping header leads down to the steam end of the compressor below. From the construction point of view, one of the paramount advantages of a welded system is illustrated in the welding of this steam line. Had any other method of joining been used, considerable difficulty would have been experienced in constructing the riser from the compressor to the steam header. Exact preliminary

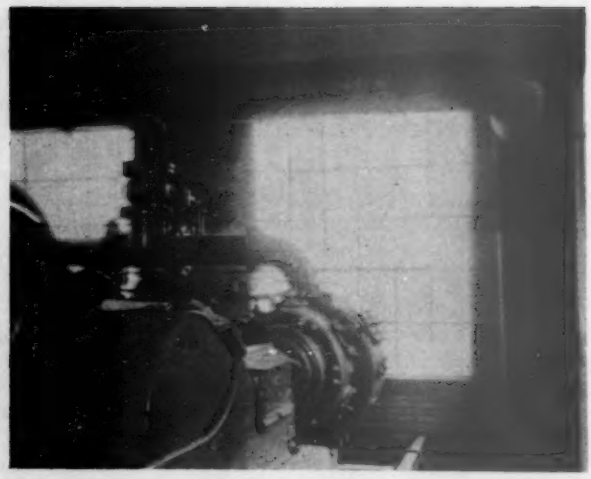


Fig. 3—Oxwelded gas header in compressor house

pipe measurements would have been required and connections could have been achieved only by the most accurate placement of pipe fittings. By the use of oxwelding, the pipe was cut to the required length and welds made right on the job, thus eliminating the necessity of minute preliminary calculations.

An expansion bend in the steam line was fabricated by welding together three lengths of pipe bent to the proper shape. Fig. 4 shows a drip pot on the steam line, which was fabricated entirely by oxwelding. Welded construction afforded the simplest and most satisfactory design.

The advantages of the oxwelded type of construction, such as ease and economy of construction, adaptability to any conditions of installation and freedom from leakage, have resulted in greatly increased use of the oxy-acetylene process by public utility corporations throughout the country.

Fig. 4—Drip pot fabricated by welding

The efficiency and economy of the oxy-acetylene process in repair work has also been realized by the same public utility company that had found this method so satisfactory in their plant expansion program, as described in the foregoing paragraphs. One night during the past Spring, the temperature dropped unexpectedly and water which had been allowed to remain in two exposed after-coolers, froze, badly cracking both castings. Ten feet long and 14 in. in diameter, each of these after-coolers cost several hundred dollars. Cracks extending almost the full length occurred on the under sides of both castings, each break involving several minor fractures.

Replacement would have entailed great expense, aside from the inevitable delay in waiting for new castings to be shipped. Having checked these facts, the plant superintendent sought the advice of a prominent contract welder. The latter surveyed the situation and estimated that the repair job would require three days if the coolers were delivered to his shop immediately.

When the coolers arrived, further examination of the extent of the damage prompted the contract welder to consult with an oxy-acetylene service operator. He, in turn, recommended bronze-welding. There were also eight minor fractures extending from the main break, each averaging a little over 2 in. in length.

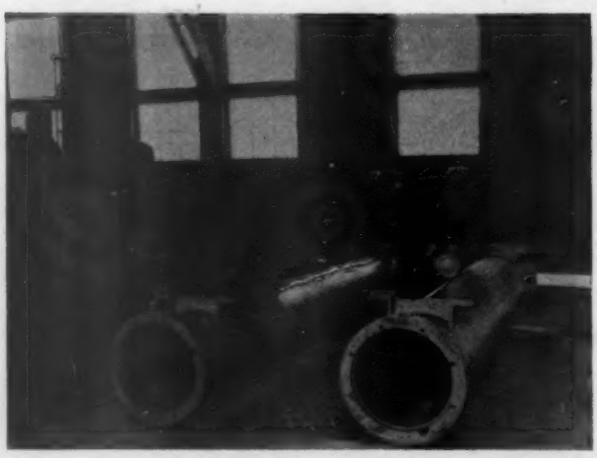


Fig. 5—Chipping and grinding preparatory to bronze welding

In preparing the castings for welding, the first step was to chip the large crack and each branch with a diamond-point pneumatic chisel, then with a flat cold chisel to form a 90 deg. vee. Using a power grinder, the paint was then removed from an inch or so on each side of the vee. Fig. 5 shows both these operations. Finally, the vees were thoroughly wire-brushed to remove dirt and other foreign material.

Meanwhile, a set of cradles to support each casting in the preheating furnaces had been fabricated by cutting small diameter scrap pipe into short lengths with the oxy-acetylene cutting blowpipe, and welding the pieces together.

The castings were then lowered into the furnaces, resting securely on the cradles, but with sufficient clearance to permit of turning as the welding progressed.

After igniting the charcoal fire in the first furnace the entire piece was covered with asbestos paper. When the casting had been brought to the proper temperature, a "black" heat, the actual bronze-welding operation began. The first step was a thorough tinning of a section about 4 in. in length, starting at the extreme end of the crack. When tinning was completed, bronze was built up in the vee to form a weld slightly higher than the surface of the casting. A similar weld was then built up at the opposite end of the fracture. By alter-

nating from end to end, successive 4 in. sections were welded until the cracks had been completely filled in. This procedure was followed to avoid the possibility of stresses resulting from a long continuous weld. The pieces under treatment were allowed to cool slowly in the fire, the asbestos coverings being left in place until the castings were stone cold.

Both castings were then subjected to a hydrostatic pressure test which was easily passed. The results obtained were highly satisfactory to the gas company as the repair accomplished by the use of the oxy-acetylene process had effected a substantial saving over replacement costs.

Strip Steel Annealed, Galvanized and Japanned, Continuously and Rapidly with Gas Furnaces

J. B. NEALEY

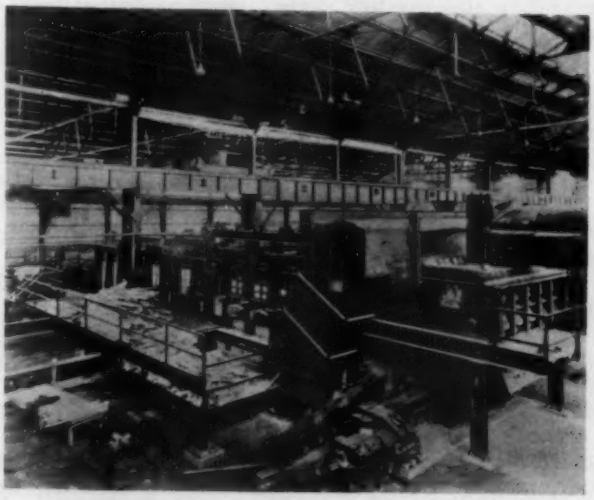
American Gas Association

ONE of the world's largest manufacturers of a full line of hot and cold rolled strip steel is the Acme Steel Company, Chicago, Ill., and its Riverdale work is a model in every respect including plant, equipment and lay-out. The main building is about 2000 ft. long and contains a continuous hot strip mill and three batteries of Box Annealing Furnaces. Other buildings contain hoop mill, merchant mill, cold mills and galvanizing. The hot strip mill consists of 12 stands of rolls two-high and rolls 10 ft. slabs 2½ in. thick and of various widths, the resulting product ranging from 3 to 20 in. in width and .049 to .440 in. in thickness.

The hoop mill, for hot rolled hoop steel, contains 11 stands of rolls two-high and the product from this mill is between 1 and 3¼ in. wide and .025 and .140 in. thick. One of the cold mills rolling box band contains 12 mills two-high set in four stands. The product ranges from one to 2½ in. wide and .010 to .045 in. thick. The other cold mill, for strip, has 16 mills set in four stands per trains. Three of these trains are 10 in., 12 in. and 16 in. respectively and produce strip from 1½ to 20 in. wide and from .002 to .250 in. thick. A finishing mill of each size is set separately from the trains. Both medium and low carbon steels are used.

One of the most interesting features in this plant is an installation which takes the strip steel and anneals, cools, pickles, washes and galvanizes continuously, automatically and at a high rate of speed. This installation sets on two floors and there are 18 reels for the coiled strip to unwind from, which are located on the second floor.

From these the strands of strip run through a gas fired lead pot where they are annealed. This pot or kettle is in reality a shallow pan of cast steel, 15 ft. long, 4 ft. wide and 6 in. deep. It is fixed in a brick setting which acts as a furnace and is 19 ft. long, 6½ ft. wide and 4 ft. high. The furnace is steel encased and has seven tunnel type gas burners located in two groups on the sides. One long manifold serves the two groups on one end of the furnace, those on the other end being served with one similar. To each burner is attached an inspirator or gas-air proportioner. The heat of the lead bath is controlled with two automatic

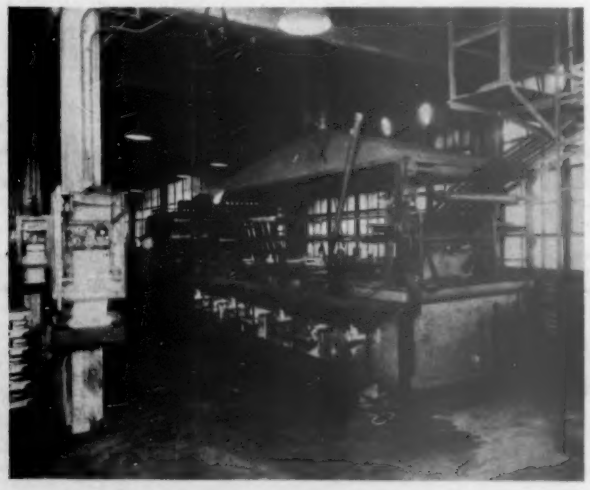


Continuous Pusher type slab heating gas-fired furnace

controllers each with a thermocouple in the bath and a recording pyrometer which gives a chart of the temperatures.

This pan will hold 7½ tons of lead and a thin coating of coal screenings is used on top of the molten bath as insulation against heat radiation and slagging.

Work up to 12 in. in width can be annealed in this pan but the total width of all the work running through at one time must not exceed 36 in. The speed of the reels is so regulated that the work travels through the bath at varying speeds from 8 to 50 ft. per min. There is another and similar setup in this plant which is used with an installation for japanning the work.



Continuous lead annealing gas-fired furnace

When the strips emerge from the lead bath the line of travel changes abruptly from the horizontal to the vertical as they rise up over a series of rolls, 20 feet above the floor, and down again. During this travel they cool off sufficiently to enter the pickle vat, wash tank and galvanizing unit. All of these units are placed in one straight line and the strands pass through each in turn. The cooling rolls are adjustable so that they can be lifted to any height to give the proper cooling period regardless of the time cycles in the lead and galvanizing baths. In this manner perfect synchronization is obtained.

The galvanizing setup consists of wood tanks for holding the galvanizing solution, and the work is electroplated as it passes over zinc bars in the tank. Electric current is furnished by four motor generator sets.

As the strands pass through and out of this bath they run over pulleys, descend through the floor to the room below where they change direction over a second set of pulleys and pass through a second galvanizing bath, similar to the one described.

Emerging from the last bath the strands are wound up on 18 coiling reels corresponding to those from which they were unwound. This battery of reels is operated from a single motor driven shaft equipped with slip clutches.

In the japanning installation the first unit in line is a gas fired lead pot for annealing, similar to the one described. There are 20 reels and they set on the first floor, the strands rising through the ceiling and over pulleys to the lead bath which is located on the second floor. In this case bright annealing is desired and is obtained by cooling the strands in an atmosphere of gas. This atmosphere is confined in a bank of 20 pipes, one for each strand, about 80 ft. long and 1½ and 2½ in. in diameter.

These pipes are located some 10 ft. above the floor and at the charging end are bent down until the ends are just submerged below the level of the molten lead. In this way the pipes are sealed off from the outside atmosphere and the escape of gas which is blown in under pressure is prevented at this end. The strands, after going through these pipes, drop down over a set of pulleys to another set which changes the direction of travel to the horizontal again, so they will pass through an automatic japanning device and a baking oven, both of which are placed directly under the pipes.

The japanning device consists of a tank of liquid japan with a series of metal rollers so set in the top that the lower half of each is submerged. The rotation of these rollers coats them with japan and as the strands ride over them they in turn receive a coating of japan. This japan must be baked on the next unit in the line in a gas fired baking oven which is constructed of brick with the gas burners set in the sides. This unit is 30 ft. long, 5 ft. wide and 6 ft. high and encased in steel plate. There is no hearth and 8 tunnel type burners are used, which fire into tunnels running across the oven and the heat is distributed through vents in these tunnels. This oven is carried at 800 deg. F. and this temperature is maintained with the aid of three thermocouples and recording pyrometers. The period that the work remains in the oven varies from a half to a full minute.

The coiling reels are located on the floor below and the strands pass down through the ceiling to these reels. This battery of coilers is divided into two long rows,

Continuous paint baking gas-fired furnace

and is motor driven. Slip clutches are provided to maintain the correct tension.

Serving the hot strip mill are three gas fired slab furnaces. The steel slabs used range in width from 3 to 19 in. and are 10 ft. long. Sometimes these are sheared hot to five ft. lengths as they emerge from the furnaces. These slab furnaces are of the end charge and end discharge type, the slabs being charged at the back end and pushed through with a mechanical pusher. They ride through on water cooled skids and drop off at the discharge end, after attaining a rolling temperature, onto an inclined slope which precipitates them onto the roll table.

These furnaces were originally designed for a capacity of 15 long tons per hour each, but are operated on a schedule of 20 long tons per hour. Built of brick, each of these furnaces is 58 ft. long and 14¼ ft. wide overall, while the width, inside the brickwork is 12 ft.

The roof is of the suspended flat arch type.

Using gas as a fuel, the furnaces are fired from the discharge end, the air for combustion reaching the burner ports at 1100 deg. F. having been preheated in a recuperator. The temperature of the gases is highest at the discharge end and gradually give up their heat to the steel slabs and lose temperature as they approach the downtake to the recuperators at the charging end of the furnace. Water cooled dampers are provided for regulating the gas and air to the individual ports across the width of the furnaces.

The recuperator extends 12¼ ft. below the mill floor and consists of special tile blocks with air passages in the vertical plane and waste gas passages in the horizontal plane. The air enters the recuperators at the bottom and passes up vertically to a common collecting chamber and then into the air supply flues to the burners.

Built-In and Attached Producers

(Continued from page 52)

PRODUCER GAS ANALYSIS

Day of Test	$\%CO_2$	O_2	CO	CH_4	H_2	N_2
			Test No. 1			
1	3.4	....	30 6	1.0	3 6	61 4
2	3.3	1 8	20 3	0.2	3.9	58.5
3	3 3	....	30 2	0.4	4.6	61.5
4	3.6	1 0	29 5	0.4	4 3	61.2
5			No Analysis			
6	2 3	0 8	30 5	0.6	3 7	62.1
7	3.9	1.1	27 5	0 4	7.0	60.1
Averages	3 3	0.8	29 8	0.5	4.8	60 8
			Test No. 2			
1	3 3	Nil	29.3	0.4	6.6	60 4
2	2.1	2.0	28.2	0.4	3.5	63 8
3	4.4	0.1	29.3	0.6	3.0	60.6
4	3 0	Nil	30.8	0.6	4.6	61.0
5	4.7	Nil	29.0	0.4	7.9	58.0
6	6.0	Nil	27.7	0.8	7.7	57.8
7	5.0	Nil	28.1	0.6	6.6	59.7
8	5.8	0.1	27.1	0 6	9.0	57.4
9	5.4	0.2	28.2	0 7	7.7	57.8
Averages	4.4	0 3	28 6	0.6	6.5	59.6

which may aid in the selection of the proper installation.

The attached producers unquestionably give a higher heat efficiency than do the central producers. In the Report of the Carbonization Committee for 1928 the results of the plant test are summarized and the producer heat balances which follow are taken from this report. The producers at Rochester and Utica were of the central (Kerperley) ring feed type and those at Stamford were attached producers of the type shown in Figure 2. This table does not include the figures of the Lowell plant which was also fired with attached producers, since in this case it was impossible to make a separation of the producer and retort balances.

COMPARATIVE SUMMARIZED PRODUCER HEAT BALANCES UTICA, ROCHESTER, AND STAMFORD PLANTS

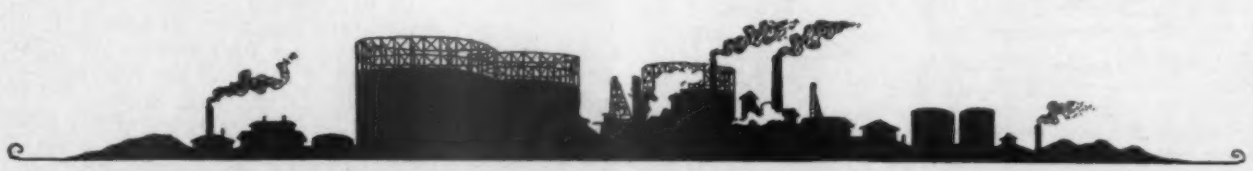
	Utica %	Rochester %	Stamford %
Input			
Sensible heat of dry coke	0 02	0 01	0 04
Sensible heat of moisture in coke	0.01	0.01	0 01
Heat of combustion of dry coke	95 00	94.76	99 24
Sensible heat of dry air	0 50	0.48	0 14
Total heat of air humidity	0 19	0.16	0 53
Total heat of steam or grate cooling water	4 33	4.58	0 04
Sensible heat of jacket water	0 05	....	....
Total input	100.00	100 00	100 00
Output			
Sensible heat of dry producer gas	9 26	11 39	16 65
Total heat of producer gas humidity	3 12	3 37	4 02
Heat of combustion of dry producer gas	70 78	72 61	72 86
Sensible heat of cinder	0 02	0 02	0 04
Heat of combustion of combustible in cinder	4 20	5 08	1 06
Heat of combustion of flue dust	2 12	0 90	....
Total heat of seal or cooling water	0 46	4 00	....
Total heat of jacket steam	5 84	....	....
Total heat of waste heat boiler feed	0 87	....	....
Heat of combustion of sulphur in coke	0 23	....	....
Radiation and convection loss	0 86	0 74	1 89
Unmeasured heat loss	2 24	1 89	3 48
	100.00	100 00	100 00

It will be noticed that the useful heat output is considerably greater with the attached producers.

Because of the fact that central producers operate at higher ratings and consequently decompose more steam, the heating value of the gas produced is somewhat higher than in the attached producers. This is shown by the Association's tests during which the average heating values of the dry gas at the various plants were as follows:

		Heating value of producer gas
Central Producers	Rochester	134.9
	Utica	129.1
Attached Producers	Lowell	101.9
	Stanford	117.8

In this discussion we have examined the various influences affecting the development of the producer. Many changes made in the past years render them available for larger capacities. The greatest improvement has been the reduction of the arduous labor formerly involved.



XI—The Househeating Furnace and Accessories

THE falling off in natural gas supply during the period of greatest activity in the early development of gas for house heating, definitely led the gas industry along the lines of gas boilers. The sales resistance to the addition of a new boiler or furnace retarded to some extent the growth of gas heating and gave the prospect this additional objection to that of supposed operating cost. Since 1927, new natural gas fields have been springing up over night. The cost of the gas is very low and the investment in a complete gas installation would be sufficient to pay the gas bill for a few years. First, cost of equipment was the deciding factor in these properties and the gas company endeavors followed the lines of using the existing coal boilers or furnaces and applying gas burners. Many unique burners were developed.

Aside from the combinations in which the grates were cored and drilled for burner ports, the designs varied from open end pipes, burning a yellow smoky flame, to burners as elaborate as any power driven oil burner. The theory of the coal fired furnace is that heat is transferred from the fire (1) by conduction from the fire through the walls of the heating surfaces, and (2) by radiation from the fire bed to the heating surfaces, and (3) by scrubbing of the hot products over the heating surfaces in the flue passages. As the usual gas flame is non-luminous, the greatest removal of heat must come from the scrubbing of combustion products. To aid in this action, baffles are used to give longer contact period and consequently greater heat absorption. These baffles were originally placed in flue passages but some designs locate baffles to generate radiant heat to make greater use of the direct heating surface. In other burners radiant energy is produced by directing the flame down into an ash or refractory bed laid above the grates. The radiant energy in either case is lower than that produced by a coal fire, as the temperatures of the radiant bed can scarcely approach those of a burning coal bed.

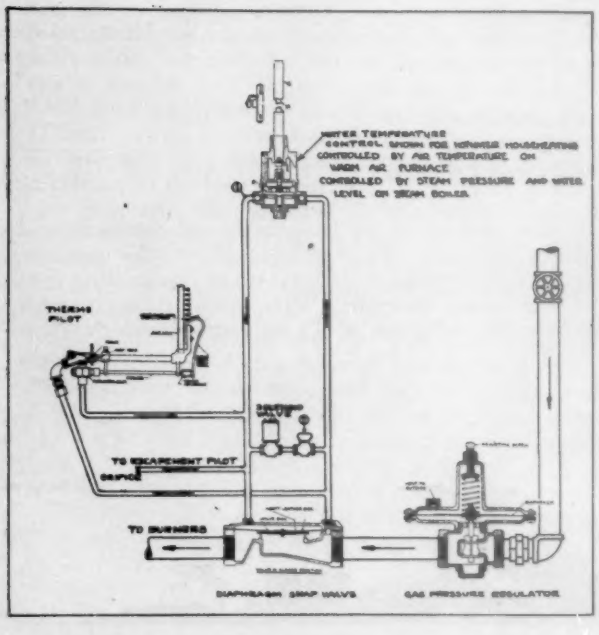


Fig. 1—Gas Controls

The applied or conversion burner has a definite field in the heating activities of every gas company. It is a low priced means of introducing automatic gas heating to prospects. It also serves to make use of new and efficient coal boilers or furnaces where the sales resistance to a complete gas installation would be too great. The burner is but a part of the heating plant and the remainder should receive much more than a casual inspection. The furnace must be carefully examined to ascertain its condition; the size must be compared with the required radiation and the necessary allowances; the piping closely inspected to discover improper installation and the flue studied well to prevent sweating and discoloring on interior walls because of cracks in the lining. The actual work of installing the burner must be checked and then all controls, burners, etc., subjected to severe but practical operating tests.

If the installations are selected only after the most painstaking and careful investigation, good records of continuous service and unqualified approval will result, with but few unsatisfactory installations.

Boiler Housings

During the past two years much attention has been paid to the jackets or housing of boilers. The basis of all boiler jackets is a frame work of iron or aluminum angles to hold in place the heat insulation, the outside of which is covered with lacquered, japanned or enameled metal. In an endeavor to make the boilers more attractive complete casings have been made from which only steam flue and gas lines emerge. An instrument board is located to show all the readings required by the A. S. M. E. and A. G. A. codes.

Every gas boiler must be flue connected with a suitable draft diverting device. As the result of two years cooperative work between the Testing Laboratory, boiler manufacturers and gas companies, very definite

conclusions were reached covering the effect of drafts. This investigation for the first time put exact limits on both up and down drafts as well as external drafts. All approved boilers will be equipped only with draft diverting devices built to overcome any probable chimney draft condition.

Boiler Controls

The fundamental safety control is the thermostatic pilot. Its action is to shut off the main gas supply if the pilot is extinguished. This is accomplished either by the expansion or contraction of a bi-metallic element or volatile liquid acting on a gas or electric circuit controlling the main gas supply. Standby pilots to assist in lighting burners quickly are of the Bunsen or semi-luminous type.

An escapement pilot is used with a diaphragm type control valve, remaining lighted while the burners are off and the valve closed. When the control valve opens, it aids in igniting the burners and is then extinguished. It again relights just before the control valve closes.

Steam Pressure Regulator

The pressure regulator, usually a bellows or diaphragm type, operates the burner controls to maintain the pressure in the system within quite narrow limits. The simplest type opens and closes the control valve by acting on the mechanical, gas or electric circuit which actuates that valve. To keep even closer limits, steam pressure regulation is often carried out by a throttling valve. Just enough gas is passed to the burners by this control to hold the desired pressure. If pressure builds up too fast with the minimum setting, this valve gives way to control by the main steam pressure regulator and the gas is completely shut off.

Low Water Cut-Off

To prevent damage to the boiler if the sections boiled dry and water was suddenly admitted to the hot boiler, a float control also actuates the control valve through a mechanical gas, or electric circuit to shut off the gas supply if water drops below a predetermined level. Two different actions are found in low water cut-offs; in one, the control valve is reopened when water again returns to the proper level, which insures almost continuous heat service. The second design requires manual resetting to again bring gas to the burners. Although this type causes interruption in the automatic service and requires manual resetting, misadjustment of the heating system become evident. Violent foaming or priming, not serious in itself, but indicating a dirty boiler, may often cause the low water cut-off to act.

Water Temperature Control

On hot water systems, the limit control consists only of a limiting thermostat. This control is similar to the thermostat of a self-action water heater, shutting off the gas through the mechanical, electrical or gas circuit controlling the gas supply.

The desired room temperature always being constant at 70° F. the necessary temperature of the circulating hot water is governed by the outdoor temperature. For a properly designed system, the water temperature should average 170° F. with a zero outside temperature. As the outdoor temperature changes, the necessary water temperature will also change. If the outside temperature rises, less heat is lost from the building and the water temperature is lessened in the same amount as the outdoor change. It is possible to manually set the water temperature limit control to meet the lowest temperature expected and maintain a close indoor temperature regulation without a room thermostat. The obvious disadvantage is the attention needed. A development which automatically anticipates changes in room temperature because of outdoor variations was originally designed to regulate the temperature of circulating hot water from outside conditions. Two bulbs filled with a volatile liquid are in series, i. e., both connected to one master chamber. One bulb is located in the flow line of the circulating hot water, the other in a protected outside place. The action of the control depends on the relative volume of the complete thermostatic system. Since both the bulbs are connected to the master chamber, a reduction in volume of one of the bulbs must be made up by an increase in the other to bring about action of the control valve. The control, which is adjustable, is usually set for a reading of 170°. Assuming the outdoor temperature has been 30° F. a certain volume is created in that leg. The volume of the other leg just fills the space and brings about move-

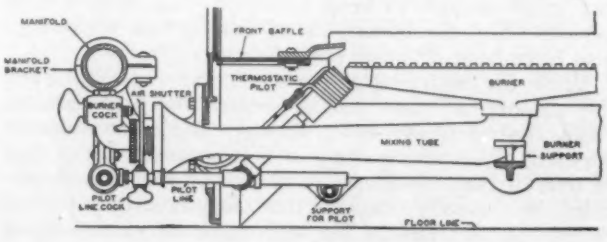


Fig. 2—Mechanical Controls

ment when the temperature of the flow line is 140° F. If the outdoor temperature drops to 15° F. the liquid in that leg contracts, and the gas valve opens until the temperature of the flow line is high enough to make up the difference in volume. The temperature required for this is found to be 155° F. It can be seen that any change in outdoor temperature which would in time affect room temperatures, is at once reflected in the flow line temperature. The actuating chamber can function through any of the usual mechanical, electrical or gas circuits to control the gas supply. With the success of the hot water control, steam and warm air controls were perfected. The application is somewhat different but the principle and results are the same.

Warm Air Limiting Controls

A thermostat located in the furnace bonnet set for a maximum of 250° F. issued to prevent overheating of the furnace, ducts and registers and eliminate any fire hazard. Its method of application is the same as other limit controls.

Room Control

The temperature of the living quarters determines whether heating is proper. It is possible to allow personal comfort to decide this point and in the districts of cheap natural gas, control valves are operated by chains in the rooms by which more or less heat can be generated by manually adjusting these valves. Careful research at the laboratories of the Society of Heating and Ventilating Engineers determined the limits of the comfort zone. This work indicates that for residence conditions, 70° F. best meets the comfort desires.

With this value firmly established, instruments functioning by room temperature was designed to automatically control the production of heat. The instrument is located at the breathing line, normally 5 ft. above the floor and on a wall free from unusual drafts or heat lines. In general, the room instrument operates by the expansion of a bi-metallic strip which causes an arm to make or break an electric circuit. This circuit in turn controls the gas supply by a motor opening and closing the gas valve or by a solenoid valve which carries out the same function. For residence heating a clock is usually a part of the room thermostat. It is set to change the temperature of regulation for day or night service. Seventy degrees is the most acceptable day temperature and 55° to 60° the night.

Clock Control

The reason for clock control is hard to definitely assign. Room thermostats were much used on coal boilers and it is generally considered that clocks were used to shut off the boilers over night as the coal capacity was not great enough to keep a full fire for such a long period. The considerations of comfort at night may also have been of importance.

With the wider application of gas fuel, however, the question of time control created much discussion. Clock control is advocated strongly and as strenuously opposed. Even though one of the important facts, that of overall fuel consumption, has never been clearly decided, it is usually admitted that clock control saves between 5% and 15%. The opponents of clock control consider the effect of the heating load on gas plant operation of more importance than the comfort of the customer. When the clock changes the thermostat from low to high, the gas starts at once. If the clock is set for 6 A. M. it comes just at the beginning of the breakfast cooking load and continues almost throughout this period. Without clock control it is contended that the boiler operates intermittently during the night to maintain the higher setting and consequently the heavy morning boiler demand does not coincide with the breakfast load.

It is probable that the overlapping of loads is much overrated by the opponents as very many more heating installations could be added without approaching the peak hours of Thanksgiving or a winter Sunday Noon.

There are some advantages to clock control, other than increased cost, of great moment. A night temperature of 70° is uncomfortable in a bedroom and even though windows are open and the radiator shut off there is sufficient circulation in the lines during the "on" cycle to overheat a sleeping room. In the morning discomfort readily occurs if the temperature of the house is "coasting" to the setting of the thermostat. Then the circulating system is cold and turning on the radiator cannot bring heat to the bedroom as no circulation of heated fluid exists.

Every consideration, cost of operation, quick heating and customer comfort, points unmistakably to the advantage of clock control.

Application of Boiler Controls

Truly, if all the controls were applied indiscriminately a boiler would be a fearsome thing. However, they are so applied that a simple circuit accomplishes all the functions by means of a single or at most two valves in the gas line. Fig. 1 shows a circuit operated by a single diaphragm snap valve. Gas pressure can be exerted on the bottom of the valve alone or on both top and bottom. As the area of the top exposed to gas pressure is greater than that of the bottom, the main valve is closed if pressure is exerted on top and open if pressure is only on the bottom. Gas flows to the top of the diaphragm through the riser at the inlet of the snap valve if either the solenoid valve, the valve of the thermostatic pilot or the valve on the limit control is open. The snap valve will close then (1) if the room thermostat is at 70° F., (or the desired point) which opens the solenoid valve; (2) if the pilot is out, opening the pilot valve; (3) if the steam pressure, water temperature or air temperature is too high or (4) if the water level is too low (in steam boilers only).

Another system using mechanical methods is shown in Fig. 2. A single valve, spring operated, controls the gas supply. The mechanism is similar to a toggle joint with two springs set to snap the valve open when the closing force is released. An expansion element from

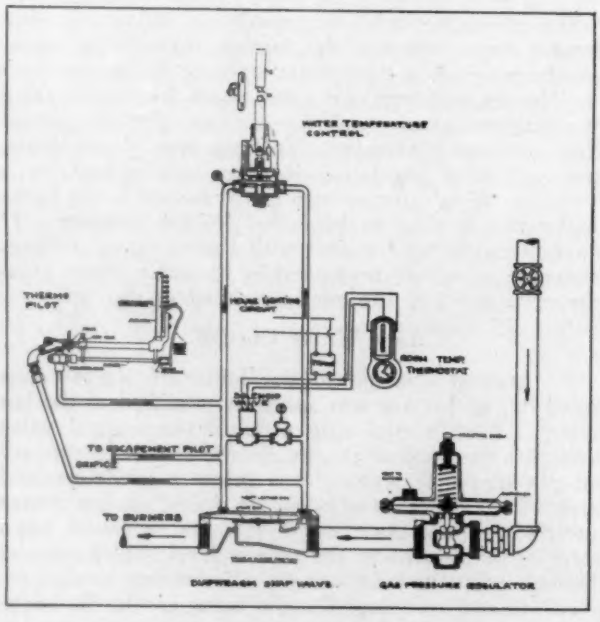


Fig. 3—Electrical Controls

the thermostatic pilot prevents any action if it is extinguished. The limiting control (steam pressure or water temperature) consists of a bellows in the flow line which moves a balanced lever. A rod from the lever closes the gas valve. The room thermostat (if motor and chain operated) also is attached to this lever arm. The newer design is to mount the motor from the room control on a bracket adjacent to this valve and operate it by an eccentric arm from the motor. A low water level causes the float to release a weight which falls and holds the gas valve closed until manually reset.

An all-electric method of operating the gas supply valve from the room thermostat or the various boiler operating or limit controls is shown in Fig. 3. The gas snap valve has a box mounted on the head in which a mercury switch is actuated by a magnetic control. The mercury switch in turn permits a magnetic circuit to operate the valve stem. When the current passes through the closed series circuit of the thermostatic pi-

lot and combined steam pressure regulator and low water cut off, the valve is capable of being opened by the room thermostat.

The thermostatic pilot consists of an expansion rod which closes the electric circuit when heated and breaks the circuit when cooled.

In this design, the pressure regulator and low water cut-off are in a single housing, either of which can operate a mercury tilt switch. The excessive steam pressure unbalances a lever system, tilting the switch and breaking the circuit, while low water drops the float which in turn tilts the switch through a solid arm. Reducing the steam pressure or bringing the water level to the proper point again closes the circuit.

The room thermostat is connected directly to the valve terminals and operates the gas snap valve in accordance with the temperature of the room.

In addition to these controls, there are special types used on certain appliances whose purpose and function are self explanatory. Humidifiers are used on warm air furnaces to give a moist atmosphere. A float valve keeps a constant water lever in a pan so placed that the heat of the sections causes evaporation which is carried along with the warm air. Secondary air shutters, low gas pressure shut off valves and others can be enumerated.

Boiler Selection

Picking a gas range is determined by appearance and generally the recommendation of a satisfied user of that range; installing a water heater in many cases resolves itself into deciding on the biggest appearing heater for a certain limited expenditure; but selecting a boiler depends on the construction of the building.

Temperatures tend to equalize and do so by heat being lost by the body of the higher temperature to the one of lower temperature. Any substance, whether it be air, water, wood, stone, glass, etc., placed between the two substances retards the loss of heat and each substance has a different rate at which the loss of heat is retarded. This is known as the coefficient of heat transmission. In the construction of buildings various materials are used in the walls which offer resistance to the loss of heat in a cumulative amount, so that total overall resistance to the loss of heat can be calculated from the individual coefficients or determined by experiment. Walls have been built according to usual building practice and experiments carried on to determine how much heat is required to keep the space on one side of the wall at 70° while the space on the other side is at lower temperature, either zero or some fixed temperature and with the usual wind velocity of 15 miles per hour. There are heat losses other than through walls, ceilings or floors and the greatest of these results from the cracks around doors and windows. Air infiltration, as this loss is known, is based on an average wind velocity of 15 miles per hour. Loss of heat, either through walls or cracks, increases as the wind velocity increases so that corrections are necessary to allow for the extra heat loss caused by that carried off by the higher velocity of the prevailing winds.

To offset this loss of heat from the warmer body (the interior of the building), a heating system is needed which is able to distribute sufficient heat to the various parts of the building to maintain the desired temperature inside with the worst possible outside weather conditions. The design temperature must be based on an inside temperature of 70° F. and the outside temperature 5 to 10 degrees above the minimum registered. Temperatures below this outside design temperature are so infrequent and last such a short time that it is uneconomical to install a system large enough for this rare condition. In designing the heating system it must not be inferred that the heating system will work at full capacity at all times, but with such design, assurance is had that heating will be sufficient on the coldest days,—the ones requiring the most heat.

(Continued in August issue)

"Movie" on Valves Available

THE widespread use of the mechanical appliance known as the valve, and the important part it plays in every branch of industry and in the home itself, is illustrated interestingly in an educational motion-picture film entitled "Open and Shut," prepared by the United States Bureau of Mines, Department of Commerce, in cooperation with an industrial concern.

The scenes of the film illustrate the story of the valve as told by a salesman to members of his family. First, the different types of valves—the angle valve, the globe valve, the gate valve, the check valve, etc.,—are illustrated in close-up detail. The group proceeds to the kitchen, where angle valves on the sink and the steam radiator are shown. They go to the basement, where the valves in use on the refrigerating plant, the water softener, the water meter, the steam heating furnace, and the hot water heater are examined. The scenes that follow illustrate the various processes employed in the manufacture of the different types of valves.

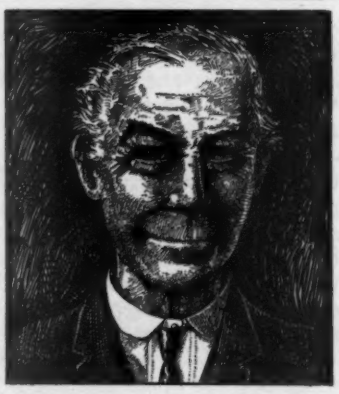
Gas or appliance companies who would like to have their employees see this picture may secure a copy for showing without charge by addressing the U. S. Bureau of Mines, Pittsburgh, Pa. The only cost is the transportation charge from Pittsburgh to the point of showing and return, which the borrowing company is expected to pay.

Furthering Househeating

HOUSE insulation is making it easier to sell gas for house heating. In the case of new homes it is often possible through the use of insulation, to effect savings in the amount of radiation necessary and in the size of the boiler or furnace to such an extent as to enable one to offer an insulated house plus a gas boiler or furnace for a price very closely approaching the price of a good oil burner installation. With good insulation it is possible to reduce operating costs to the point where the difference between oil and gas costs is very much reduced. Most prospects will favor gas over oil if the difference in operating costs is small and with the added advantage of greater comfort and added house value, the job of selling gas is very greatly reduced. With insulation being applied to homes already built successfully, the same line of reasoning can be applied in the replacement field. Most certainly close cooperation with insulation companies should be effected.

—J. P. Leinroth, New York Regional Sales Conference

Letters from a Gas House Terrier to His Grandson



Copyrighted 1930, American Gas Journal

Dear Sam:

It ain't necessary to tell you that it's been some time since anybody needed to look at my teeth in order to tell that I'm old enough to know what I want to wear. In which connection, I had a pair of experiences saddled on me t'other day that kind of fitted into what I'd noticed lately around some gas companies.

I was kind of driftin' along the street lookin' in the store winders and not costin' myself nothin' when I caught string-halt right in front of one of 'em. On one of them wax dummies in it was a suit that caught my fancy right off. In fact, your Grandma had spent the better part of fifty year in successfully tryin' to keep me out of jest that sort of suit.

But I hadn't got across the store's threshhold good before I found I wasn't in no clothin' store—I was in a clothin' automat. And when I who had gone in there to git something classy in large checks for street wear come out and come to, the large checks was mine—in the store's till with my signature on the lower right-hand corner of 'em. And what I had on was what the boys at Yale was all wearin'—in 1909. I had gone in to git what I wanted, and come out with what they wanted—to sell me. I had been the biggest stock-movin' event of their day. And even in my daze I hears something that sounded suspiciously like, "Oh, Ikey! Rush one of them niftick Egyptian polar bear fur overcoats into the summer stock, quick—the gentleman may be back!"

Well, naturally, son, you couldn't have got me back in there without the use of tractors and a couple of good hydraulicjacks. But I was more in the market for clothes than ever then, and I figures safety would lie in the other extreme.

So in my shame and innocence I marches into one of them places that's so high-hat they won't even show you a hat without submittin' your pedigree to the Field Museum authorities, or a coat without testin' your coat of arms with acids.

Not that them boys weren't game; two of 'em fainted when they seen me in what them strong-arm' lads had backed me into while I was still unconscious; and they said the old gent, screaming through his whiskers in the far corner was their head designer, and not strong anyhow. But aspirin was rapidly passed out among the help, and a pale lad in adenoids, spats, and waistcoat—not vest—come teeterin' forward to do his duty or bust a corset-string.

As I hinted, they wasn't nothin' vulgar like a stock of goods visible

around the place. Oh, dear no! The idee was you set down on the edge of a soft chair, bein' careful not to spill no cut-plug or pipe ashes on the carpet, and told the attendant what you wanted. Then you set a spell longer while this perfect lady in cutaway coat and gray-striped pants tiptoes back into the Silence and tries to persuade the board of directors to let you look at what you want to buy for twice what it's worth.

Well, Sam, they got out three street-editions of the papers—which ain't as long as it sounds--while I set there waitin' in the Hush for that big-checked suit. But the point is I got it! And that they had to send across a couple of drawbridges to a sailor's lodgin'-house district to get it ain't got nothin' to do with the point of my yarn. Which is, that when they didn't have what I wanted in stock they didn't bust bloodvessels tryin' to ram something down over my ears that they had and I didn't want to have. And neither did they let me get away until they'd found what I wanted and sold it to me.

And as I went out all checked up, I couldn't help thinkin' about my gas company friends in the same connection. They go and rent a corner location so good that the saloons would all have been fightin' for it in the old days; and doll it up inside until it makes the de luxe cabins on the Leviathan look like the interior of a North Dakota cow-barn durin' a hard winter, and then set a stock of gas ranges and appliances in it that indicate about as much choice for the customer as a pair of Siamese twins have in decidin' whether they'll spend their vacations together or apart.

Now, hold on, Sam: don't squawk yet! Ain't nobody spent more years than me learnin' that no gas company is big enough or got room enough to stock all the kinds and styles of gas appliances they is--the old Atlantic City pier at Number One Atlantic Ocean used to groan right smart under <u>that</u> load.

But what I mean is, the brain is quicker than the eye. Stock what you can—but don't let no woman walk out on you because she dont see what she wants on your floor. The minute you see her nose goin' up in the air about your stock, remember that Paramount Pictures was once a poor boy—and start showin' her pictures too. Pictures in color and big enough so she won't have to reach for her readin' glasses to make out the fine points of your merchandise. Put those pictures in a fine big easy-handled album, or mount 'em on panels in one of these swingin' display racks that makes lookin' easy. Maybe you'll want 'em on colored slides that you can slip into a high-class new-fangled magic lantern. Or fit up a' art gallery room, sort of, for 'em, with its walls hung tasteful with 'em. But whatever you do, Sam, make 'em look so good that them women's mouths'll water for them whether they are in stock or in transit. Economize on scratch paper or rubber bands or the president's salary if you must, but don't try to do it on your display equipment I've just mentioned, either. For remember, my boy, you can safely and frequently give a human bein' credit for thirty days or for a nice bill of goods, but the one thing you can never afford to give 'em credit for is havin' imagination. You got to show 'em, and show 'em an eyeful. Not forgettin' to print prices, sizes, makes, and full details right under every picture in plain figures. Foreign languages too, in the bigger cities.

What's more, I b'lieve several manufacturers would be injured in the rush to supply your merchandisin' departments with jest that kind of sellin' pictures and outfits, if they was properly approached by a bright young man with bigger sales in his eye.

Of course, you want to sell your stocked stuff, and you will. But remember my big-checked suit—and never turn a prospect loose 'til she's seen and bought what she wants—even if you have to take her, personal, in your car to the plumber that may have the very model she picked from your picture; or wire Sears Ward and Roebuck to air-mail a battery of baking ovens for a forty-story hotel. Either way, you're durned liable to make four good friends—the customer, the manufacturer, the contractor—and your own boss.

Yours for a little headwork and a lot more sales,

Monoxide Mike.

Boiler Horse Power and Mechanical Horse Power

SOMETIMES confusion exists regarding the relationship between a boiler horse power and the horse power of an engine or motor.

Surprising as it may be, a boiler h.p. is 13.2 times as great as a mechanical h.p. Here are the actual figures:

One boiler h.p. = 33,479 B.t.u. per hour

One mechanical h.p.=2544.6 B.t.u. per hour

The reason for this great difference is that in the early days when boilers and engines were first made and used, a 100 h.p. boiler was called a 100 h.p. boiler because of its ability to supply enough steam to run a 100 h.p. engine. A 200 h.p. boiler could furnish enough steam to run a 200 h.p. engine. And so on.

But boilers are much more efficient now than they were in the days of James Watt. There has been such an improvement that today a 100 h.p. boiler will easily take care of a 250 h.p. engine. Engines have improved also but not to the extent that boilers have improved. Therefore the old relationship no longer holds. But it is nevertheless a fact even today that a boiler h.p., according to the modern definition of a boiler h.p., is 13.2 times as great as a mechanical or engine horse power.

It is evident that in the "old days" when one boiler horse power produced one mechanical horse power the efficiency of conversion was only $1 \div 13.2 = 7.6\%$. In other words, only 7.6% of the heat energy in the steam was converted into work. Today the best plants show efficiencies that are much greater, being as high as 27%.

The best types of Diesel internal combustion engines are much more efficient than the most efficient steam plants. It is not uncommon for Diesel engines to produce efficiencies of more than 30%. Records as high as 50% are claimed.

How to Use Color in Window Displays

THE use of color in window displays was the subject of a talk by Mr. H. W. Butterfield, Display Director of the Brooklyn Edison Company before the Show Window Display School sponsored by the Electrical Association of New York and held at the Westinghouse Lighting Institute, Grand Central Palace, New York.

Mr. Butterfield, an authority on window displays that attract pedestrians to store window and urge them to buy, gave the following six rules for applying color to displays:

1. Focus the color to the main product in the display.
2. The focus point does not always need to be in the center of the window.
3. Window displays can be made to appear changed by merely changing the color schemes.
4. A variation of height in the construction details adds to the effectiveness of colored window displays.
5. Never use more than one primary color in the scheme of the window display, but many tints, shades, and secondary colors of this color can be used.
6. Use the same colors that manufacturers specify with their window trims because they have studied the problem for each particular product and know what colors are best for the season and product.

Requisites of Employes

COURTESY, tact, promptness, thoroughness and neatness are the stimuli of all successful business enterprises. Collectively they represent "Service" which should be an accompaniment of all the commodities a gas company sells, by virtue of which every employe becomes a salesman. Of course such important attributes are not inherent characteristics of the average employe, hence their development by the company is necessary. The training of employes has been the subject of some very laudable articles and convention reports in recent years, hence its consideration at this time is deemed unnecessary.

However, we must be wary lest such training become too academic. In the final analysis, the human element cannot be ignored. Good company-employe relations is the best assurance of good customer relations. The employe must be imbued with an interest in his work and appreciate his job. Vacation with pay, as well as sick benefit, old age pension, death benefit and group insurance plans sponsored by the company have accomplished much. A friendly salutation from the boss a little sunshine in the offices and shops, will be reflected by the employe in the customer's home.

—Harry Ellis, A. G. A. Distribution Conference

A New Foursome
of old acquaintances

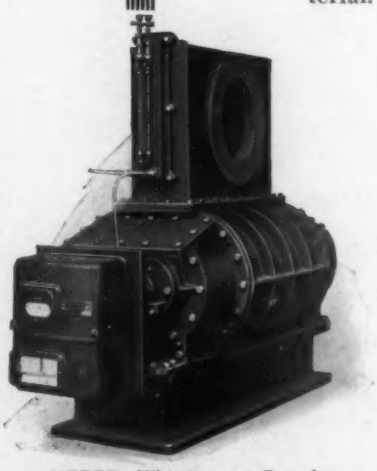
The three manufacturers of positive displacement equipment and one manufacturer of holders, whose names you see below, have been well-known to the gas industry for years — individually.

Now, under "The Stacey Engineering Company," our combined experience and skill is at your service.

Our Blower Division will welcome the opportunity to tell you *why* our *Rotary Positive Displacement meters, gas pumps, boosters, exhausters and water gas blowers* give you dependable, efficient and economical service.

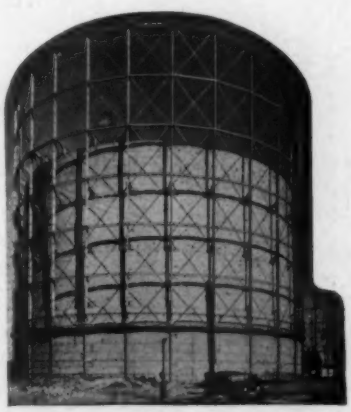
No matter what pressure or how large or small your holder requirements, our Holder Division offers the right holder, highly resistant to corrosion and wear, built to suit your needs, and unexcelled in workmanship, design or material. Ask the Holder Division about the 9 *special points of superiority* of the "Stacey Bullet."

Our "Ability to Serve" you instantly, reliably and practically, completes the well-rounded resources of "The Stacey Engineering Company."



METER—With Demand Recorder.
BLOWER DIVISION—Home Office
12th Street & Columbia Avenue
Connersville, Indiana

ROOTS



10,000,000 cu. ft. Holder—Buffalo, N.Y.
HOLDER DIVISION—Home Office
5535 Carthage Pike
Cincinnati, Ohio

CONNERSVILLE

Blowers · Gas Pumps · Meters · Cycloidal Pumps

Wilbraham-Green

The Stacey Bros. Gas Construction Co.

CHICAGO
20 N. Wacker Drive

NEW YORK
420 Lexington Avenue

The Trend Toward COPPER

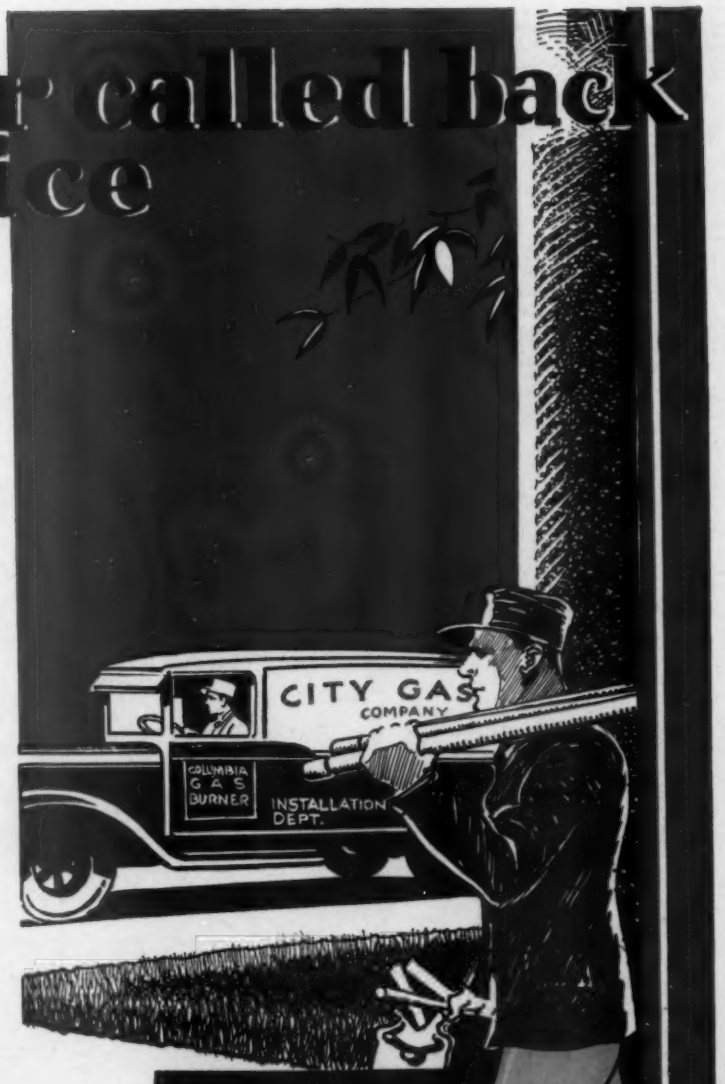
WHO can doubt the advantage of a copper boiler? Every man, woman and child recognize that a boiler made of copper is as distinct an economy for any home as screens, gutters, roofing and every other purpose where rust can occur.

NOW copper heaters are brought close to the smaller homes. With such a slight difference in price above any good make of galvanized system. The KOMPAK ALL COPPER AND BRASS HEATER is the most wonderful value on the market.

THE KOMPAK COMPANY,
New Brunswick, N. J.

KOMPAK

and he's never called back for service



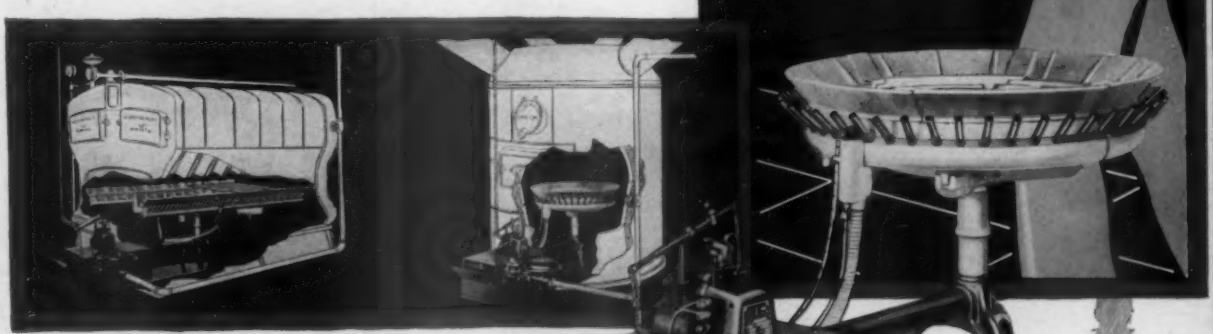
An average saving of one-half day's time for two men on installation and the fact that they never need go back to service it, insures you a larger net profit on your heating load with every Columbia Burner sold.

Simplicity of installation, factory tests on both gas and electricity, trouble-proof air-cooled Safety Pilot, lack of Baffle replacement, no pre-mixer troubles even on extremely low pressures—those are just a few COLUMBIA features which make this Burner easy to install, free from service difficulties and fully satisfactory to the customer.

Complete information on the COLUMBIA Burner brings further proof of the extra profit and satisfaction to be realized from the COLUMBIA franchise. We will be glad to send you this proof and details of a complete merchandising plan to help you sell Gas for house-heating.

The Columbia Burner Co.
1645 Dorr St., Toledo, Ohio

The Burner with the Air-Cooled Safety Pilot and Safety Lighter



Showing the "Patrician" Model of Magic Chef in a Remodeled Early American Kitchen

Patents Pending

The Line to "PUSH"

MID-SUMMER IS HERE! Gas range sales begin to mount. "What line will I feature?" Is this a question uppermost in your mind? Should it be a question?

● Is there any other gas range manufacturer whose volume of national advertising can compare with that of American Stove Company? Is there one other who has so consistently advertised his product over a long period of years? Is there another who has developed a gas range of such outstanding beauty and merit as is possessed by "Magic Chef?"

● Gas range buyers have long been conscious of the Red Wheel and the high quality that it symbolizes. Through American Stove Company's present national campaign the nation is likewise being made conscious of the fact that there is something new, something more beautiful, something more efficient in gas ranges—namely, "Magic Chef."

It Is a GOOD Gas Range That Has This Red Wheel

● And through the sales policy adopted for "Magic Chef," retailers are awakening to the fact that better gas ranges can be sold at a legitimate profit.

● Full page four color advertisements in leading national magazines with an immense combined circulation create a wide interest in Magic Chef. Window displays and a highly developed newspaper ad service likewise stimulate sales of the New Vogue in Gas Ranges. This sales promotion is an aid not only in selling Magic Chef but also helps sell better Gas Ranges. All Retailers of Red Wheel Gas Ranges are urged to co-operate with this biggest of all gas range campaigns—to the end that they may sell MORE GOOD gas ranges and earn MORE SATISFACTORY profits.

Magic Chef

AMERICAN STOVE COMPANY

DEPT. B, 801 CHOUTEAU AVENUE, ST. LOUIS, MO.

Largest Makers of Gas Ranges in the World

CASH-PRICE

$195.00

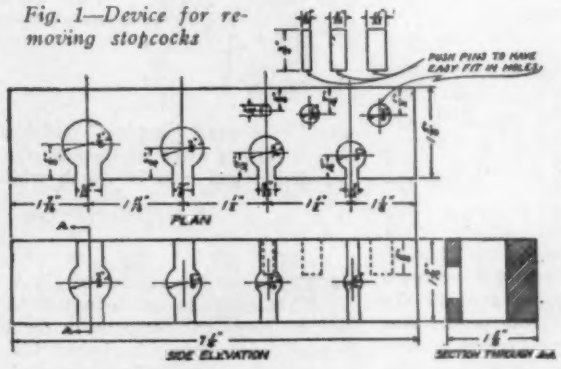
($210 West of the Rockies)

Send name and address for free copy of booklet showing modern kitchens.

Care and Storage of Orsat Apparatus

EVERY two months replace all short soft-rubber connections used to hold glass tubing together, as these connections will deteriorate if left longer and may give trouble through leaks. The rubber connections should be renewed every two or three weeks when the apparatus is in constant use. Never replace the same connection after it has been removed for cleaning, renewing solutions, etc.

Fig. 1—Device for removing stopcocks



In renewing and removing the connections apparatus breakage can be avoided by not trying to slip the connections from the stems but by shaving down the side, using a sharp knife, and then peeling off the tubing. Never use gasoline to loosen adhering pieces of rubber, as some of the gasoline might accidentally get into the pipettes or manifold and thus cause erroneous results for methane.

Solutions—Pour out all solutions and wash, drain, and replace all pipettes. Although the solutions may not be worn out, it is not good practice to save old solutions. Solutions that have been but slightly used should be preserved in magnesium citrate bottles.

Stopcocks—Before putting the apparatus in storage remove stopcocks and wipe the grease from the barrels and plugs. Clean any accumulation of grease from the bore of the plug and from the barrel outlets. A piece of small copper wire (18 to 20 B. & S. gage) with a short L bend at one end is convenient for cleaning the outlets. After flushing the manifold and barrels with slightly acidic water, wipe the latter dry, insert a thin strip of paper about one-fourth inch wide the entire length of the barrel and over the outlet leading to the pipette, grease the plug lightly, and place it in the barrel. This will prevent the plug from sticking or freezing and will also seal the opening to the absorbing solution. Secure the plugs against dropping out and breaking by tying them with wrapping twine or looping a rubber band around the constriction below the handle and passing it over the small end of the barrel. Another convenient method for securing the plugs is to wrap one end of a 3-inch length of about 18 to 20 B. & S. gage copper wire around the constriction at the handle and the other end around one of the branches of the stopcock. As stopcock plugs are not interchangeable, it is a good plan to remove, clean, and replace only one stopcock at a time, otherwise they might become mixed.

Removing "Frozen" Stopcocks—If a stopcock becomes stuck, warm the barrel rather quickly by placing it in boiling water for a few seconds and then, before it cools appreciably, hold the stopcock in one hand and attempt to turn the plug or tap it gently with a piece of wood. The stopcock may be tapped on the back if the plug sticks through the barrel or on the handle if it is not the hollow-tube type. Repeat the heating from time to time. If this does not remove the plug, the device shown in Figure 1 (which consists of a block of hardwood, such as maple, bored to receive the handles of the cocks and to support the barrel on the rim so that the plug may be forced out by closing a vise as shown in Figure 2) is often successful. Similar devices may be purchased from laboratory-supply houses.

The method for using the device as shown is to select a hole just slightly larger than the diameter of the plug so that the barrel will fit over the rim, place the bottom of the block against one jaw of an ordinary vise, set a hardwood pin having a diameter slightly less than the small end of the plug against the end of the latter, and close the vise until the pressure is exerted on the plug. Avoid strain and allow free movement of extending arms or attachments to the plug outlets. Continue tightening until the plug is loosened or breaks, because if it will not become loosened in this manner it is almost useless to try other means.

Storage—Store the apparatus in an upright position. The other items to be considered in storing it are: (*a*) Minimize danger of breakage through rough handling; and (*b*) keep it away from excessive heat, as the latter causes rapid deterioration of the rubber connections and air bags.

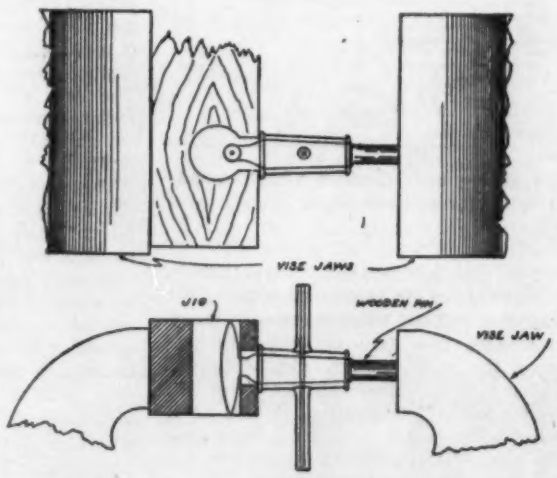


Fig. 2—Detail of stopcock removing device

Systematic Inspection—The apparatus should be cleaned, prepared for use, and a sample of gas analyzed at intervals of not longer than two or three months.

The practice of periodically analyzing a sample of gas accomplishes two purposes: (1) It assures the usability of the apparatus and gives indication of the need for repairs or new parts; (2) it gives the personnel, whose duty it may be to analyze samples, opportunity to learn and keep familiar with the technique involved.

—Miners Circular 34, U. S. Bureau of Mines

Merchandising Views and Reviews

OUT WHERE testimonials are secured there is one company that does not resort to anything save the strictly legitimate type of advertising and they do the greater portion of it on a co-operative basis. The company is the P. G. and E., owned and operated by Californians. This company co-operates with the state, the cities in which it operates, the Gas Appliance Society, and dealers to tell folks of the advantages of owning and using modern gas appliances. We are

Hotel hot water service for every home

Supplied by automatic gas water heaters

Enjoy hotel hot water service in your own home.

An automatic gas water heater brings you this wonderful convenience.

It supplies plentiful hot water for bathing, shaving and the laundry—gives it immediately, day and night,—provides such comfort for small or large homes at the cost of a two-cent postage stamp for ten gallons of hot water. (Ten gallons is plenty for a bath.)

1. An Automatic Storage System keeps a supply of steaming hot water in the boiler—always ready for use.

2. The Automatic Instantaneous Type heats an endless stream of water at the turn of a faucet. No boiler needed for the water heats as it flows through hot coils.

After using an automatic gas water heater for a month's time you would never be without it.

Send for further advice

(Mail to local office of Pacific Gas and Electric Company)

Dear Sir:

Please give me, without obligation, further advice on Automatic Gas Water Heaters. Tell me how I can have hotel hot water service in my home.

Name

Address

PACIFIC GAS AND ELECTRIC COMPANY

P-G-and-E

reproducing one of their advertisements on hot water service.

IT'S gas refrigeration time; that is, all time is gas refrigeration time. The season is at hand when more folks begin to wonder how they are going to preserve the milk, butter, etc., etc., and whether they had not better hang out the ice card. Refrigeration, if sold as it deserves to be, as a wanted high class specialty, will reward the aggressive gas man this season as never before.

If the gas man will get rid of the idea that "it is so new" and that "folks can't be made to understand about the water" and a few more things that the man who *wants* refrigeration is not troubled about and go out and sell the idea of ice from gas, the silent operation of the gas refrigerator, the foods to be saved through proper refrigeration, the resultant better health and any one of a thousand things along the line of *what it will do for you* he will go over big.

As we view it refrigeration sales should be a specialty job, and not just another item of merchandise for the salesman to sell. The man who makes a success of selling refrigeration will be a man who can talk his story from every angle and not jump off at a tangent when an opportunity to sell a tank heater or a gas range bobs up. That's just an idea taken from the records of the successful sale of many specialties.

IF I were a salesman and did not secure enough leads to make some real money every day I would frame this story and hang it where I would see it every morning: It seems a certain uplifter of color was very desirous of having chicken for his Thanksgiving dinner; For some days before Thanksgiving he prayed: "Oh Lord, send me a chicken for my Thanksgiving dinner." However this repeated supplication failed to bring results. On the eve of Thanksgiving the prayer was changed to: "Oh Lord send me to a chicken." The prayer having been given urge, 'tis said, was answered.

A NUMBER of new radiant gas heaters have been developed for this year's customers and this is the time of the year that the gas man should begin to think about the method he will employ to capture those empty fire places this fall. The sale of gas coal and wood fires, radiant fires and fire place units should be the objective of every gas man this coming fall.

The manufacturers of this type of appliance have done a great deal to build up customer acceptance and to develop modern and period designs that offer a very wide range of styles to choose from, so many in fact that we do not see how any empty fire place can escape—that is provided a consistent plan is laid down to capture them this fall.

A LITTLE stunt that interested us is being used by a gas company advertising man. This man publishes what he calls a *merchandise abstract* for distribution to employees interested in merchandising. The abstract which is run off on a Ditto machine contains bits of information gleaned from trade magazines, house organs and from manufacturer's representatives pertaining to sales, interesting advertisements, special stunts, sales per meter, prize contests window displays, etc. In many instances, where special articles appearing in a trade paper are too long to abstract without losing the main points he simply refers to the source and page number in his abstract. Where there are a number of employees in the sales department this plan should prove a mighty good one and where such a plan is operated for a group of properties we would say that it would prove very valuable. For a small additional expense photostats might be made of unusual window displays and advertisements, and a binder might be provided to file the "abstract" for future reference. "The

world is starved for ideas" and any plan that furnishes more of them to the merchandising gas man is worth while.

"THE one big reason why gas water heaters have not been sold in a big way by every gas company in the United States" said a man who knows his water heaters, "is that the four essential problems have not been faced or solved by every gas merchandiser in the United States.

"When the Boss decides that he wants to see the sale of gas water heaters extended to the limit the man responsible for the sale has four major problems to solve: 1—Choosing the right heater, 2—Determining the needs of the market he expects to sell, 3—Fitting the heater to the individual needs of the prospective user, 4—Plan to gain customer acceptance." In other words this man "feels that the average activity that has flopped has flopped for the main reason that the plan was not a plan at all, as the modern merchandiser understands it, but simply a decision to 'run a water heater sale,' which in the main consisted of publishing a few newspaper advertisements, inserting folders with the monthly gas bill, a display of heaters on the sales floor and in the window and a meeting at which the help were told that a big water heater sale was going on." And there seems to be the truth in a nutshell.

TELEPHONE selling is very productive—if it is properly thought out. If you contemplate using this type of approach try it out on the Mrs. without telling her that you are going to employ such a method. Get her reaction. She'll help

you wonderfully and cut off many rough edges that you did not see. Also, see that the voice that does the telephoning has a smile in it. Many 'phone sales plans have fallen flat because of a flat tire on the calling end of the 'phone.

THERE is nothing wrong with this picture from *Ruud-iments.*

Folks that are buying new bath room equipment are RUUD-HOT prospects for gas hot water service—tell 'em and you'll sell 'em, and more than likely cut down the complaint expense that usually follows the sale of some un-known, non-approved gas water heater.

THE secret of selling, as we have often said, is in being sold on what you are selling and exposing yourself to sales. Honest-to-goodness crew managers learned this fact a long, long time ago and used it. It has always been our belief that any well made, fairly priced gas appliance may be sold in great quantities by almost any man who is not tongue-tied and who will devote at least five hours of the day in exposing himself to sales.

We know that this is not generally done. Why it is not done we have not taken much trouble to ascertain. We have been content to attribute it to the plan of compensation, the fact that the point of saturation has been approached, or that folks are tired of having some one rapping at their door. These things may have something to do with it, yet we are of the opinion that the fault is due to a lack of education. Men who are sent out to sell the appliance have not been sold themselves and hence make only a mediocre success. To strengthen this idea we quote a story which appeared in the Westinghouse Electric and Manufacturing Company's March *Sales Hand Book.* It is the story of J. G. Donovan, an employee of the Associated Gas and Electric Company, Warren, Pennsylvania. This man in charge of changing customer's service from 25 to 60 cycles, and not an employee of the sales department has been elected to the Westinghouse Master Load Builder's Club. To gain this honor Mr. Donovan sold 352 percolators during a forty-five day all-employee drive for the sale of that appliance. The secret of his success "was due to the fact that he was *sold* from the start on the item which was being campaigned. Consequently, while contacting the public, in line with his regular duties, he never failed to talk percolaters". Mr. Donovan sold forty-four percolaters on his high day and not a day passed during the whole campaign that he did not make a sale.

This man was *sold* and consequently he was successful in selling others. He is very much like a high-ranking salesman which *The Big Idea* the employees water almanac, published by Ruud tells about and who when asked why he was so successful in selling merchandise replied, "I know what I am talking about." He had learned about what he was selling or had been taught; he believed, had faith, and confidence, or what you will, and went forth and exposed himself to sales.

We do not know of a manufacturer of gas appliances that has not published the whys and wherefores of his appliances, which, if studied, would enable any salesman to learn all about what he had to offer the prospective customer. How many salesmen have sold themselves in this way we do not know. We leave the answer to you. Yet we venture to say that those who have, have made a success of selling.

IF YOUR store is in the middle of the block make it the lightest store in the block,—much lighter than the corner store—and you'll find it more than pays for the difference in the cost of rent. Light creates an atmosphere of cheerfulness and draws folks to your store and window, light says that you are congenial and courteous, cheerful. Try it. Light up.

WE understand that another big poll will be taken very soon, the same to do with the amendment of the manner in which the gas man has pushed the sale of gas heated clothes dryers. Of course, if this be true, there should be a spokesman for the poll and we here and now nominate Jim Trainer for the job of

head-line hunter in the proposed Dryer Poll. In our opinion and from what we have been able to learn he has always been an ardent advocate of the basement dryer, and that he knows his dryers.

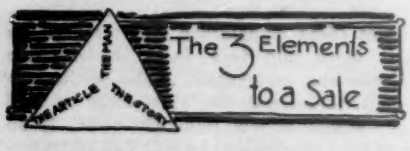
THE vital ingredients to good adtising are to be found in many of the products of the advertising men connected with the gas industry these days. Sales ideas embellished and vitalized by art work and type faces in both the classic and modernistic modes are in evidence to intrigue the most blasé as well as the woman who holds the power to do her own purchasing. Layout full of movement and text matter that conveys and expresses ideas and thoughts in plain unadulterated English are to be found in many of these advertisements.

A great deal of this type of advertising has been used in the east and is more or less familiar to the readers of trade magazines, where much of it has been reproduced. However this in no sense means that the middle-west, the New England states, the south and the Pacific Coast states are not tuned-in to the times and that their advertising (the gas man's) is not in step with the modern tempo. To

this writer it seems that while gas service and gas appliance advertising as a whole have gone moderne there is a different interpretation of this up-to-the-day trend in every section of the country.

To illustrate more clearly what we may term the sectionalization of the moderne trend and tempo we are reproducing three recent advertisements used by the Laclede Gas Light Company, St. Louis. It will be noted that these advertisements contain all of the ingredients (sales ideas) so essential to modern good advertising. They are moderne to the fullest extent, with their classic type faces, in light, medium and bold, illustrations in a timely technique and layouts that are full of swing. The three advertisements are fully moderne yet they contain a localized atmosphere that ties them in to the general trend, not in the east or south but in the middle-west. We would say they contain a "personality" of their own that represents very excellent examples of what is produced now-a-days in the ad-foundry of the 1930 gas industry.

THERE are three elements to every sale; know them and your sales curve will take an upward trend. 1—Know



the article you wish to sell. 2—Know the man you wish to sell. 3—Know the "what it will do for you" for your sales story. Knowing all that it is possible to know about these three elements will enable you to make a sales success of any item.

HOME service workers, here is some data for your scrap book. According to the *Magic Chef* Doctor Shirley W. Wynne, Commissioner of Health of New York city, in a radio talk broadcast recently, gave the ten following rules in regard to foods and real cooking:

1—Don't bore your stomach with a monotonous diet.

2—Don't despise the lowly turnip and onion.

3—Don't scorn the cheaper cuts of meat; when properly cooked with vegetables they are better than a diet of steaks and chops.

4—Buy fresh vegetables when they are plentiful.

5—Allow a quart of milk a day for each child and a pint for each adult.

6—Don't be afraid to try new dishes.

7—Adopt a cosmopolitan menu—become acquainted with minestrone, goulash, Irish stew, pig's knuckle and sauer kraut, and a ragout with vegetables.

8—Don't eat too much sweets.

9—Drink several glasses of water daily.

10—Do real cooking. Good health will not last with last-minute meals.

The above ten points should furnish the domestic science expert with many thought provoking ideas for class and school talks and rightly applied help get folks back to the idea that home cooked foods are better.

Is your store moderne tempo? If it is not you cannot hope to build up store sales. Women, the purchasing agents for the home, are seeking "wanted" wares and new things to make home work more efficient in the more moderne shops. One company that makes a specialty of re-arranging stores and designing moderne store fixtures tells us that several utility organizations are completely re-arranging and equipping all of their stores, even in the smallest cities, in order to draw trade that is now passing their doors. *Domestic Commerce* also has something to say about the value of moderne fixtures. Thus: a recent article in Good Hardware, claims that, as a result of installing modern fixtures and an open display system, an Eastern hardware store had an immediate increase of more than 15 per cent in sales, with sales volume continually rising; increased its turnover to almost three times a year; increased holiday sales about 50 per cent the first year; increased the unit sale; doubled sales to women; lowered costs by enabling at least 25 per cent more business to be handled by the same force; and increased margins."

The value of open displays, to take one of the advantages of modern display referred to, is very great. Recently the sales representative of an electric lamp company told us that where dealers used what his company terms "a lamp merchandiser" the sales were often increased as much as 100 per cent in a year. The merchandiser" is an open display that enables the customer to see and examine the lamps and is usually placed so that every person entering the dealer's store will pass it. Aside from showing the various sizes of lamps, all plainly priced, the merchandiser carries a terse selling message; a recent one being: "How about Lamps?"

Gas men who handle small appliances, kitchen ware, polishes or enamel cleaners might try the open display to speed up the sale of such merchandise.

WHEN it comes to bulletin board displays, S. C. Reiser, Director of Displays, Laclede Gas Light Company, St. Louis, Missouri, has gone the best of them one better, as may be seen from one of the day and night boards used by that company, which is reproduced on this page.

WINDOW display advertising is being given a great deal of thought by the gas man these days with the result that, by and large, the industry has stepped-out ahead of all others, so it seems, in the matter of display.

The gas man who is making a study of window display advertising will no doubt be interested in what Domestic Commerce reports in regard to the life of manufacturer's displays, as it will help him to gauge the time limits of displays in accordance with the size of the city or town in which the displays are installed. As we view it a display should remain in the window long enough to secure complete "coverage" or a one time circulation, and for the average we would say that one week is long enough for any display to remain in the gas company's window.

On the other hand, here's what Domestic Commerce reports; "The average manufacturer's window display is estimated by various types of retailers as 10.3 days, according to survey reported in Drug Trade News. Dealers' estimates range from 1 to 56 days, the average being

found to decline as the size of the town decreased, with the exception of towns under 10,000 where the average life was reported 12.3 days. An average sales increase reported being from 5 to 100 per cent."

The Common Sense of Window Display

RAY MARTIN

Director of Display, Consolidated Gas Company of New York

IT is well for us to remember how different the display problems of a Utility Company are from those of practically any other merchant. Compare their problems, for example, with a Woolworth five and ten cent store. In this type of window we see huge quantities of pencils massed in unusual designs, glasses piled high, tin ware, or perhaps salted peanuts—all of it "sell on sight" merchandise. Across the street, windows are devoted to shoes—Thom McAn shoes that sell at a price, or Knox hats. Or it may be exclusive Parisian hats or an arrangement of Restaurant delicacies; but in every case *interesting* things—"sell on sight" things. Some windows may be commonplace, others unique, but the majority of the merchandise shown possesses an appeal that is totally lacking in the appliances a gas company offers for sale.

Now let us visualize the reactions of a window shopper viewing the windows of one of the few remaining gas companies that continues to—just show appliances. If she stops at all, she probably sees a gas range. She realizes that it is nice and done in rather harmonious colors, but what of it? Hers is black, but it still cooks. A tall cylindrical tank, perhaps painted green, reminds her of her hot water boiler at home. A card alongside says something to the effect that it is an automatic water heater. A white refrigerator—"Isn't that funny—when did the gas company start to carry Frigidaire?" There are other cards in the windows but she has no time nor inclination to read them. She passes on to other windows—more interesting windows. Herein lies the difference between the windows of a Utility Company and those of other merchants.

The windows of department stores or small shops, referred to before, are selling appearance in one form or another, whether it be coats, shoes, hats or linoleum. Their durability or comfort are, after all, secondary. Fur coats are a good illustration. This type of merchandise is not primarily bought to keep women warm. It is a question of style—the style or appearance to which I refer. Think it over. On the other hand, a gas company must sell service, as exemplified by comfort and convenience. The woman looking in the Utility windows did not realize that the gas range she saw was equipped with an oven heat regulator and an insulated oven. She could not visualize the immedate hot water supply that would be hers if she boughts a gas water heater, because there was nothing in the displays to assist her in forming a mental picture. The bald statement that ice was made by heat seemed too ridiculous to believe.

Gradually, it became apparent that Utility Companies must create a definite type of window display advertising applicable to their own needs if their windows were to show a profit. This could not be done at once because none had a display department—as we know it today. Fortunately for us, as well as the Utility Companies, there never has been a problem that could not be solved. The solution in this case, after some research and development, was an entirely new type of window display that appropriated many of the best elements of showmanship and periodical advertising. It was called Window Display *Advertising*. The first examples were crude. I remember some that fortunately are no longer in existence. However, let it suffice when I say that a steady development followed until we arrived at what I consider to be a representative display of today.

Show Display

Not so long ago another Utility, the telephone companies, devoted considerable attention to popularizing the phrase, "The voice with the smile—wins." Employees, as well as subscribers, liked it. They saw the logic of such a statement, so they applied it. The slogan worked; it resulted in better service; it was adopted. The advent of dial instruments is fast eliminating the necessity for such a slogan as far as telephone companies are concerned, but smiles always have, and always will, play an important part in any type of advertising.

With the display that I have just shown, it is a case of "The display with the smile—wins," because it appeals to the observer's emotions as well as to her reason. And, as we all know, emotions are frequently more effective than reasoning with a large number of window shoppers.

Let us again visualize a woman standing in front of a show window. Now she is looking at the display shown herewith. Let us suppose that she reads and absorbs its message. "The owner of this smile has an automatic gas water heater" is a simple truth that she is bound to remember with pleasure. Suppose that tomorrow morning her hubby is a bit "out of sorts" because of a lack of hot water for shaving. Thoughts of this display are bound to come back to her and she will be sure to tell him—the brute—that if he got a gas water heater he would have hot water when he wanted it—and a smile for her instead of a grouch. He may only grunt, but if his wife remembers this window dis-

Portion of a paper read at Eastern Division Display Men's Convention, New York, June 9-12, 1930.

play (wives never forget anything) she will see to it that he ultimately buys the water heater. Or next week or the week after *he* may see another gas company display on hot water. That may clinch things. In any event, it is only a question of time before the display with the smile wins and Mr. Jones buys an automatic gas water heater.

I have taken up the past few minutes with a somewhat detailed explanation of this particular display because I feel that you are interested in the sales psychology in back of this type of window as much as you are in the display itself. Incidentally, it is but one of an endless chain of production that, in the case of my own company, is repeated every working day. By that I mean one complete display based on an entirely different sales appeal is produced every day for the windows of the Consolidated Gas Company. Meeting this schedule requires ten men and a duplex studio totaling, in the aggregate, 6,500 square feet.

But now I suppose you are thinking, "that type of window display may be alright for a Utility with a monopoly, but it is too indirect for my windows." If you are, don't forget that a gas company, for example, has very real competition. True, only one company in a locality is engaged in the manufacture of gas, *but* many fuels can be used to heat water. Also, in the house heating field the utility is pitted against many manufacturers of reputable house heating equipment. Therefore, it is of the utmost importance that gas company windows create interest in and a desire for possession of *gas* appliances. To do this requires the combined ingenuity of the "idea man," "the copy man," the artist, and the letterer—rather than the employment of one or a hundred placards and price cards.

You may be interested in what Utility Companies think about pricing merchandise in show windows. This, of course, varies with the individual company. Here is my formula: Just as in a high pressure, low pressure, or any other kind of sales talk, feature price in your window only when you display merchandise that is to sell on a price basis. Ignore it completely when you show things that are selling at a price justified only by an understanding of their quality and workmanship, or in the case of utilities, by the comfort and convenience they render.

Look once more, if you will, at this piece of metal here on the platform. I refer to it as such because that's all that it is to the eye. Labelling it an automatic gas water heater does not increase your interest. Therefore, the job of the window display is to translate this fabrication into understandable, intimate everyday things such as warm baths—without waiting; piping hot water for shaving; and the like. Remember that people want comfort and convenience. They will gladly buy it, but they will not buy water heaters at $5 each if we do not first make them conscious of the fact that the water heater is the most reliable means to this end. This is the job that utility windows must do. It is the job that the windows of progressive companies *are* doing, and will continue to do until some better method of creating sales is developed.

Glorifying Gas

Annual Affair of Pacific Coast Utility Revives Enthusiasm

SPECIAL CORRESPONDENT

ONE of the most successful Gas propaganda affairs in the Pacific Northwest is the annual event known as the "Oregon Journal Cooking Matinées and Soirées," given by the Portland Gas & Coke Company's New Business Department. The photograph taken from the platform shows part of the audience and the type of women who daily flocked to these demonstrations and lectures. It is interesting to study the faces and expressions, as the faces denote that these are real homemakers who are still interested in better cooking.

The famous chef of one of the most famous hotels in America, (the much-beloved "Palace" of San Francisco noted for its splendid cuisine), Mr. Philipp Roemer, was the principal attraction, assisted by one lady lecturer and three lady demonstrators, including the special representative of the Tappan Range Company, while the Gas Company's Smoothtop expert is one of its own staff in the Home Service Division. This is the second year of the annual undertaking and, while the attendance was not as big as the year before, the audiences were large and there were none to turn away as had to be done on the previous occasion when the event was more of a novelty.

Electric vs. Gas Light

Another interesting conclusion from studying the accompanying picture is in noting how many women wear glasses, which may be indicative of the harm done by electric light or by poor lighting and might be a boost for Gas light if the gas industry had taken advantage of the superiority of its product before it was almost entirely shelved by the aggressiveness of the electric industry.

It is a well-known fact and admitted by those who are willing to be fair, that Gas Light is far easier on the eyes than electric light, although electric light has many advantages in other ways. One who gets tired quickly in the evening reading under electric light, might go on for hours if he had a suitable gas light instead. Is it not a fact that the eye strain caused by electric light, or at any rate by the wrong application of electric light, must be the cause of approximately half the women in the audience wearing glasses? And isn't this rather a sad commentary on our much-vaunted progressiveness?

Appliance Sales Jumped

It was found that in spite of the sales room being completely upset and almost entirely vacated as far as appliances were

concerned, when compared with the usual superabundance and variety of appliances on display in the beautiful salesrooms of the Portland Gas & Coke Company, more business was transacted in the actual sale of appliances during the entire week than in any previous week of the year.

But aside from this, the principal thing attained is the renewed prestige of Gas for Cooking, Waterheating, Refrigeration and Househeating,—a prestige which not only impresses the audience, but creates enthusiasm in the entire salesforce. Anyone who has ever been out soliciting and has met with the thousand and one criticisms and rebuffs which the Gas appliance salesman encounters, will realize how necessary it is to frequently squirt some Seltzer into the Rhine wine in order to keep it sparkling. Or if this should not be understood by the "Drys," one might illustrate the remark by putting it in this way: That the stimulating effect of a cold shower wears off and cannot be expected to last all week. And so does enthusiasm need constant replenishing and nothing is so reviving as to give the salesmen fresh pride in the product they have to offer.

Southern Gas Association Holds Twenty-second Annual Meeting

UNDER the able leadership of President D. H. Levan the Twenty-second Annual Meeting of the Southern Gas Association developed into one of the most successful gatherings ever held by this organization. Something over two hundred gas men from widely separated points were in attendance and their sojourn at the DeSoto Hotel in Savannah, the place of the meeting, was well repaid by a discussion of problems of great interest to the Gas Industry as a whole. The meeting was held June 10-13th.

Aside from matters of more serious moment, the delegates and guests were accorded a generous portion of old-time Southern hospitality which left nothing to be desired.

After calling the meeting to order President Levan introduced Mr. Gordon Saussy, Mayor of Savannah, who welcomed the delegates and referred to the fact that modern men of industry, especially those in the public utilities, are cognizant of their duties both to the customer as well as their company. He further stated that in present-day business success is largely dependent on integrity. Col. E. S. Dickey, of Baltimore, responded to the Mayor's address in his usual interesting and forceful vein.

After his address President Levan introduced Mr. George E. Whitwell who spoke on "Promotion of the Gas Industry." Mr. Whitwell went into considerable detail concerning the efforts that are being made to sell electric ranges on a large scale. He indicated that such efforts can be successfully combatted if the gas men will more strenuously and more intelligently apply themselves to their selling procedure. To show the pressing nature of electric range sales Mr. Whitwell cited a case of where, with electricity at 1 and ¼ cents per Kwh., one company allowed $15 for trade-in on the purchase of a $125 electric range and made no charges for connection.

D. H. Levan

Dr. Wilbert J. Huff, Professor of Gas Engineering, Johns Hopkins University, in his report of the work at Hopkins mentioned the various lines of research that are being pursued. These include research on purification and other activities. Dr. Huff stated that the cost of purification in this country amounts to upwards of $5,000,000 per year. Hence, he indicated that if only a nominal percentage of this could be saved by research the latter would have proven worth while.

Mr. Edgar G. Hill read a timely paper, "Natural Gas and Its Future in the South." His paper will be found in full elsewhere in this issue.

In his paper, "Evaluating the Industrial Gas Load and What it Takes to Get It, Mr. H. E. Meade spoke of the value of an Industrial Survey to get additional customers when introducing Natural Gas. This he said was to offset any tendency of dropping off in the consumption due to the preponderance in B. T. U. of Natural Gas over Manufactured Gas.

"With the A. G. A." was the title of an address by Major Alexander Forward, Managing Director, A. G. A. He stated that the Gas Industry was well holding its own and is moving steadily onward to better things. He mentioned that the Industrial load is now 27% of the total output. Other important points touched upon by Major Forward included the sales mindedness of the Gas Industry, the great growth of Natural Gas, Home Service, A. G. A. study courses, dealer cooperation, etc. In closing he quoted President Mullaney to the effect that the gas energy for the year 1929 was more than nine times the electrical energy, on a heating basis.

The paper by Mr. M. J. Roberts, "Conversion Burner Sales Methods," mentioned that Natural Gas has broken down the cost barrier for househeating; also, that the converted burner job has helped to overcome the high installation cost obstacle. The paper went on to say that the good word the satisfied user passes around among friends is considered splendid advertising and publicity.

Mr. A. J. Goss presided over the meeting of the Technical Section which was favored with the reading and discussion of a number of excellent papers. "The Use of Bunker C Fuel Oil as Water Gas Enricher," was handled by Mr. C. A. Schlegel. He told of the investigation that is being carried on relative to the use of low grade oils for carburetting purposes. This paper evoked considerable discussion.

The paper by Mr. W. A. Dunkley, "Effect on Distribution Systems of Changing from Manufactured to Natural Gas," mentioned the various problems that confront the engineer under such conditions.

The final paper, "Butane Gas and Its Value to the Gas Industry," was splendidly handled by Mr. O. M. Setrum. It outlined the method of using this form of gaseous energy and mentioned the very large field for its use.

Other papers presented at the various sectional meetings were as follows: "Proper Merchandise Accounting," by L. Long, "Credits and Collection," by C. W. Blackmun, "Meeting Electric Competition in Range Sales," by R. F. Dougherty, "Home Service as a Gas Sales Aid," by Miss Jessie McQueen, "Water Heating a Major Activity," by Frank Lemke, "Laundry Equipment Sales Possibilities in the South," by H. C. Timewell and Jim Trainer, "The Future of Refrigeration by Gas," by R. R. Guenther, "Relative Value of Various Advertising Media," by M. M. Scott, "Cooperative Regional Advertising," by R. C. Hoffman, "Increasing

Gas Sales per Customer," by S. L. Drumm, "Merchandising Central Heating Plants," by L. C. Harvey, "Space Heating Sales Possibilities," by A. C. Carnahan and "The Market for Unit Heaters," by Hubert Humphrey.

An interesting feature of the meeting was the appointment of a committee to investigate and formulate an Industrial Gas Section.

President Levan originated a novel scheme for getting the men to register and attend the meetings. This consisted in appointing Mr. J. J. Brennan, Memphis Power & Light Company, as the captain of a "hustling committee" of five to corral those who persisted in loitering in the lobby during meeting time. The scheme was producive of a bumper crop to listen in on the papers and enter into a discussion of the same.

Much of the success of the meeting was due to Mr. J. A. P. Crisfield, President, Savannah Gas Company. As Chairman of the Entertainment Committee particularly, his efforts were well appreciated. Bridge at the Country Club and a Sightseeing Trip for the ladies as well as a Banquet on the second evening contributed greatly to the pleasure of the occasion.

The Committee on Nominations handed in the following slate which was acted on favorably: President, A. J. Goss, Vice-President, E. W. Avegno, Second Vice-President, J. J. Brennan, Sec.-Treas. G. H. Schlatter, Directors, R. E. Chew, E. G. Hill, R. C. Hoffman, Jr., and E. S. Dickey. Mr. H. E. Meade was elected chairman of the newly-formed Industrial Section.

The place of meeting for 1931 went to Chattanooga, Tennessee.

Seventh Annual New York Regional Sales Conference

THE annual New York Regional Gas Sales Conference held at Lake Mohonk, New York was productive of a number of unusually high-grade papers and discussions. These amply proved the value of the annual meetings. Househeating, refrigeration, water heating, cooking and other important matters were well handled by the various speakers.

Mr. H. E. Dexter handled the water heating situation in his paper, "Increasing Water Heater Sales." He stated that "the intelligent development of a water heater sales program requires—1. A thorough knowledge of the fundamental economics of gas water heating. 2. The compliance with these facts. 3. The aggressive execution of a plan based upon these facts." He further said,

"The question of man-power is one of the most difficult to solve. Good salesmen, experienced in the sale of gas water heaters, are not to be found but must be developed. This requires the careful selection of recruits, proper training and supervision before the cub salesmen are actually turned loose on good prospects, and then a constant supervision to see that they actually perform a full day's work. Plumbers in general cannot develop salesmen, they must be trained for them. Even when the maximum amount of care is used in the selection of house-to-house salesmen the turnover of new salesmen will be large if salesmen are required to produce the volume of business which our quotas call for.

"Consequently, if an activity of this kind is to produce a high rate of sales, it is necessary for an organization to be continually selecting salesmen, training them and trying them out in order to have available enough good men on the firing line to actually keep the business flowing in accordance with the quota. Pioneering an item like a water heater and selling the idea of continuous hot water requires real men with stiff backbones, because the discouragements are many."

In his paper, "Message to the Gas Fraternity by a Manufacturer," Mr. H. J. Long mentioned the importance of the plumber as an outlet for a great number of water heaters. At the same time, he cautioned against turning over the matter of merchandising entirely to outside agencies, citing how many Natural Gas companies had suffered by such a procedure.

Mr. J. P. Leinroth presented an excellent paper, "House Heating Sales Methods and Results of Public Service Electric and Gas Company." In it he went into detail as to how the house heating problem is handled by his company. He touched upon conversion burners and said "they are going to be more and more in the picture." Although his company concentrates primarily on specially designed furnaces he stated that as the price of gas goes down the first cost of equipment will assume a more important aspect and consequently the converted job will receive more consideration. He estimated the cost of heating with a converted job to be about 10% more than with a specially designed furnace.

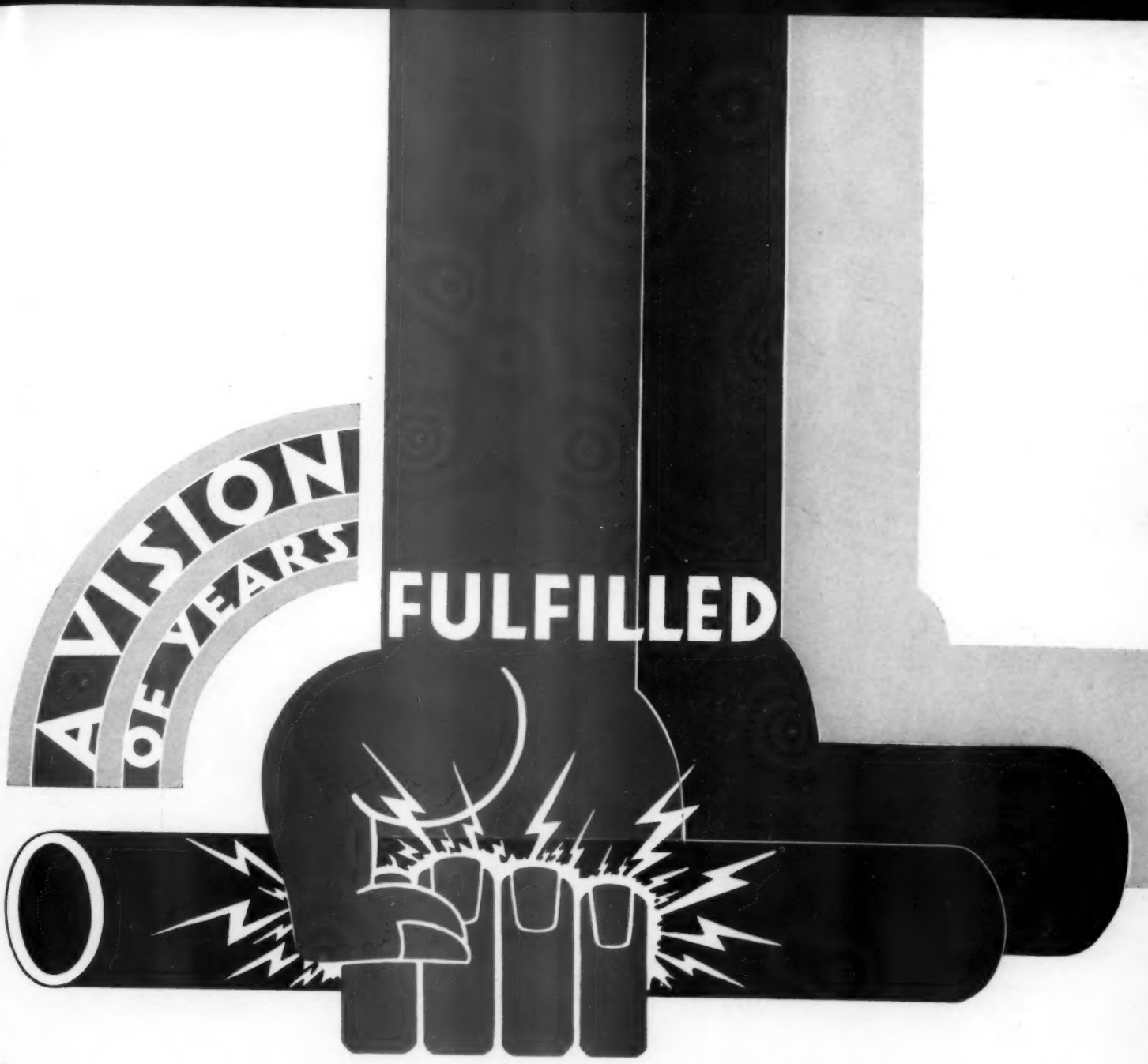
"On the Refrigeration Line" was handled by J. Percy Conklin from the "Retail" angle and by J. Lobenstein from the "Wholesale" viewpoint. Refrigeration was also dealt with by F. E. Vilas in his paper, "Promoting Refrigerator Sales by Proper Installation and Service."

In his paper, "Enlisting the Dealer as a Gas Appliance Merchandiser," Hugh H. Cuthrell said in part:

"The plumbing trade is closely identified with the gas industry because of its licensed affinity with the art of pipe fitting. The plumber is interested in the sale of gas only as a stimulus to his business of pipe fitting, and he is interested in the sale of gas appliances only as a means of promoting his pipe fitting work. He is, however, very intimate in a sense with the home conditions of his own local community and is familiar with the mechanical and practical conditions relating to water, gas and drainage in these homes, because these homes are the living places of his customers. He is familiar with their appliance needs in relation to his art. He easily develops into a merchant dealing with supplies that his customers need, and for years back he has carried a stock of goods useful to his trade. In more recent times he has taken up the sale of appliances, especially ranges, water heaters and room heaters quite independently of the local gas company. Much too often some of this merchandise has been of a character below that found in gas company show rooms. And much too often this class of merchandise entered into apartment houses and builders' home developments. This situation has been changed to a large extent by the gas company putting its very best men onto this work—but it is a type of competition that is wasteful of energy and has created antagonisms that should never exist. It is almost impossible to think of the plumbing trade as dissociated from the gas industry—and the sooner it is looked upon as an allied industry, the sooner will rapid and constructive progress be made. It will take much less work on the part of good gas company salesmen to establish friendly relations with the plumbing trade than it takes to outsell them on a competitive basis."

Other papers and addresses were as follows: "The Industry's Sales Job in the Metropolitan Area," by C. E. Paige; "Hot Water and Health," by Dr. W. R. Redden; "Educational Opportunities for Sales Representatives," by James A. Sackett; "Home Service—Its Place in the Gas Industry," by E. P. Prezzano; "Developing the Domestic Cooking Load," by Wm. E. Mills; "House Heating Sales Methods and Results," by H. M. Brundage and Frank Herty; "The Sales Department's Place in the Industry's Expansion," by Alexander Forward; "Gas Appliance Merchandising," by Charles Cross; "The Single Meter as a Sales Aid," by W. A. Adams; "Psychology of Sales—Selecting the Right Sales Appeal for Gas," by Dr. Daniel Starch.

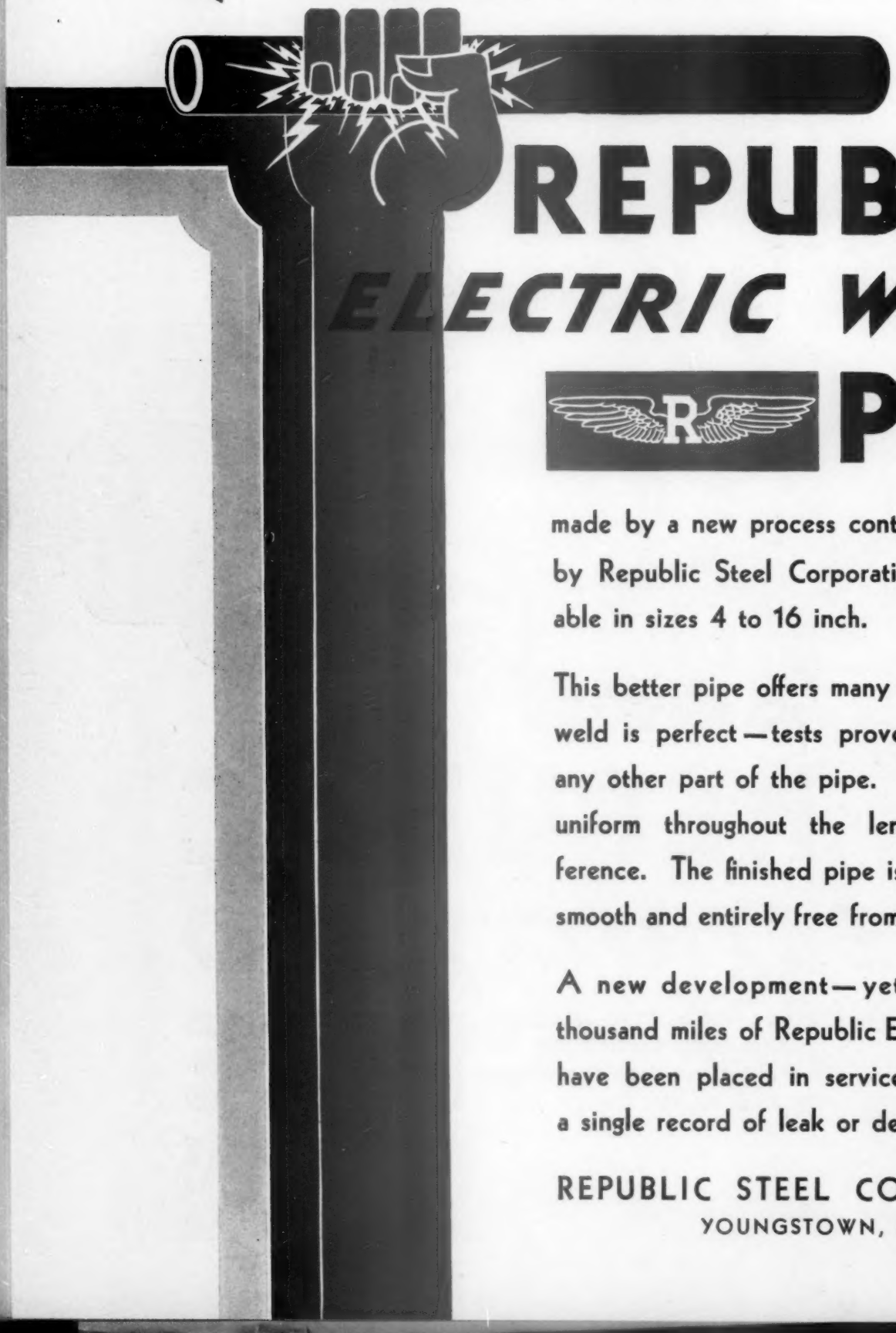
Mr. A. J. Peters opened the meeting and the address of welcome was given by Mr. T. R. Beal. A goodly attendance went far to make this Seventh Conference an outstanding success.



REPUBLIC
ELECTRIC WELD
PIPE

MADE BY A NEW PROCESS
CONTROLLED EXCLUSIVELY BY
REPUBLIC STEEL CORPORATION
YOUNGSTOWN . OHIO . . . . .

AT LAST A MECHANICALLY PERFECT PIPE....



REPUBLIC *ELECTRIC WELD* PIPE

made by a new process controlled exclusively by Republic Steel Corporation, is now available in sizes 4 to 16 inch.

This better pipe offers many advantages. The weld is perfect—tests prove it stronger than any other part of the pipe. Wall thickness is uniform throughout the length and circumference. The finished pipe is perfectly round, smooth and entirely free from scale and oxide.

A new development—yet more than one thousand miles of Republic Electric Weld Pipe have been placed in service to date without a single record of leak or defect.

REPUBLIC STEEL CORPORATION
YOUNGSTOWN, OHIO

A. T. Leavitt Elected President of Canadian Gas Association

ONE of the most successful conventions of the Canadian Gas Association was recently concluded at Halifax, N. S., Canada, June 24th and 25th, 1930. Over 100 delegates from many parts of Canada and the United States attended the sessions which, notwithstanding the distance and time taken to reach this easternmost of Canadian meeting places, were heartily appreciated and enjoyed by everyone.

A. T. Leavitt, President of the Hamilton-By-Products Coke Ovens Limited, Hamilton, Ontario, was elected president for the ensuing year. Hugh McNair, Manager, Gas Utility, Winnipeg Electric Company, was elected first vice-president; Harry A. Williams, Superintendent Gas Department, Guelph, Ont., second vice president, and G. W. Allen, Industrial Survey Engineer, Toronto, re-elected Secretary-Treasurer of the Association and Director of the Canadian Gas Association Laboratory Approval.

Other officers elected include the members of the Executive Committee made up of Arthur Hewitt and C. A. Jefferis of Toronto; J. S. Norris and J. J. Humphreys of Montreal; Col. D. R. Street, Ottawa, Ont.; V. S. McIntyre of Kitchener, Ontario; C. C. Folger, Kingston, Ontario, and J. M. H. Young of London, Ontario.

The city of Montreal, Quebec, was selected as the place of the 1931 convention, and the date June 4th and 5th, 1931.

The Association, according to the Secretary has had the best year in its history, the membership showing a substantial increase, and the financial statement revealing a very substantial balance to the credit of the organization.

The report of the Association's Laboratory Approval Division also shows a real encouraging condition of affairs, with many appliance manufacturing companies, both Canadian and American, taking active interest in obtaining the Laboratory Approval Seal.

The following exceptionally fine and instructive papers were read:

"Construction of Pipe Lines for the distribution of Gas," by J. A. Messenger, Engineer of Distribution, United Engineers and Constructors, Inc., Philadelphia, Pa.

"Humphreys & Glasgow Carburetted Water Gas Plant." Description and Operating Experience at Vancouver, B.C., by W. H. Dreaper, B. C. Electric Power & Gas Co., Ltd., Vancouver, B.C.

"House Heating With Manufactured Gas," by Roy Soderland, Ottawa Gas Company, Ottawa, Ont.

"Major Changes at Quebec," by J. C. Dawson, Asst. Supt., Gas Department, Quebec Power Company, Quebec, Que.

"Pipe Joint Research at the American Gas Association Laboratory," by R. M. Conner, Director, Testing Laboratory, A.G.A., Cleveland, Ohio.

"New Business Developments at Halifax, N.S.," by B. G. Edens, Asst. Sales Manager, and H. G. Stairs, Gas Sales Engineer, Nova Scotia Lght & Power Co., Ltd., Halifax, N.S.

"Coal Gas From High Sulphur Coals at Halifax," by K. L. Dawson, President, Canadian Gas Association, and Superintendent and sales Manager, Nova Scotia Light & Power Co., Ltd., Halifax, N.S.

"Dehydration of Gas With Special Reference to Experience With Compression Methods in Small Plants," by W. S. Dole, Gas Engineer, Federal Light & Traction Company, New York City.

"Stereotype Metal Melting," by N. E. Bertl, Consolidated Gas Company, of New York.

"Wire Baking With Gas," by O. L. Maddox, Industrial Gas Engineer, United Gas & Fuel Co., Ltd., Hamilton, Ont.

Most of the delegates had an opportunity to visit and inspect the new gas works of the Nova Scotia Llght and Power Co., Limited, where gas and coke from high sulphur coals were being produced.

The Association's Annual Dinner was of the usual high standard of quality and entertainment, many prominent men in the gas industry taking active part.

The American Gas Association was ably represented by A. Gordon King, Service Engineer of the A.G.A. and R.M. Conner, Director of the A.G.A. Laboratories. A. Gordon King was also officially representing the Institute of Gas Engineers, of London, England.

Entertainment features included sightseeing trips to outside historical parts of interest including the Land of Evangeline; Halifax Harbor, Forts, etc.

The many ladies that attended the convention spoke very highly for the social, friendly and generally good character of the conventions held by this enterprising and progressive association.

The salesroom and offices of the local company were visited by the delegates.

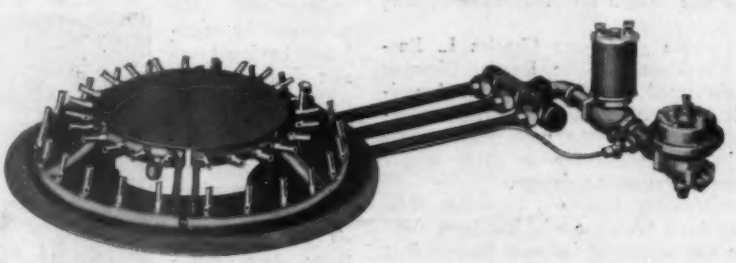
From the first to last there was something of interest for everyone attending the convention, and we have yet to learn of any of the Canadian Meetings failing in their attractiveness to gas men, especially the many from the United States who seldom miss these splendid gatherings.

EQUIPMENT NEWS

New Barber Burner For Gas Househeating

The Barber Gas Burner Company, 3702 Superior Ave., Cleveland, Ohio, have just issued Catalog No. 30 covering their complete line of Barber burners, which includes their latest "A" series Barber Automatic Burners with magnetic gas valve control, and "B" series with motor gas valve control. The illustration shows the magnetic valve control type. It turns the gas on or off automatically as is necessary to preserve the temperature at which the room thermostat is set. A transformer is supplied and the valve operates directly from electric house current. In event of the current failure the valve automatically closes, at which time the burner can be turned on or off by hand.

The catalog contains illustrations of all types and sizes of burners with sets of specifications, many covering both manufactured and natural gas. They also include in the same portfolio a 20 page book entitled "The Barber Burner Album of Gas Heating Facts" which contains a fund of information on gas house heating.



American Stove Company Brings Out New Model Gas Range

The American Stove Company, Lorain, Ohio, has recently brought out the new Tiffin Model of the "Magic Chef" line of gas ranges. This is somewhat smaller than the original Magic Chef, but has sufficient capacity to meet the needs of

Tiffin Model of "Magic Chef" Ranges

the average family. No pipe, bolts or screws are visible on this new model. It is completely enameled inside and outside, the finish being in old ivory with Verd antique marble trim. As described in their bulletin, the oven and broiler are fully and heavly insulated. Red Wheel oven heat regulator and top burner lighter are standard equipment. Handles are onyx green bakelite with chromium fittings. The Tiffin Model is made in both right and left-hand types. The cooking-top is equipped with a new type folding cover. Only the heads of the top-burners and lighter on this model are visible. The burner tray is perforated to fit over them. This prevents boil-overs, grease and dirt from getting down into the burner box.

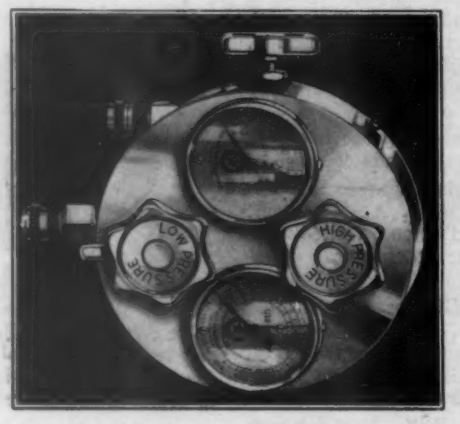
New Two-Stage Regulator For Welding & Cutting

The Bastian-Blessig Co., Chicago, Ill., announce the new Rego Red Star Duplex Two-Stage Regulator for welding and cutting.

Thirty-five years ago Charles L. Bastian, President of The Bastian-Blessing Co., pioneered the first practical American developments in high-pressure regulators. Throughout the past quarter century he has contributed to every major advance in regulator design.

In discussing the new regulator, Mr. Bastian says, "Anyone who has been close to the oxy-acetylene industry knows that the idea of two-stage or multi-stage pressure control is not new. The principle of two-stage regulation is no secret, but the application of the principle in a practical manner that will assure absolute precision, on a big production basis at reasonable cost, has been a problem which heretofore has gone unsolved. The new Rego Red Star Duplex not only offers the answer to precise, unvarying delivery-pressure at the welding torch, but also embodies many other important features of great practical value.

Starting with the definite understanding that all users have experienced trouble in holding a perfect flame without frequent readjustments of pressure a special regulator for the first stage was designed and constructed to perform in perfect balance with a precision regulator at the second stage. Both stages are thus governed by regulators having large size diaphragms of proper material, functioning at any desired pressure. The result of proper proportioning and balancing of the action of these two regulators is the maintenance of a constant neutral flame, regardless of fluctuations in tank pressure.



Rego Red Star Duplex Two-Stage Regulator

Another detail that was given attention after observations of actual service, was the shape of the adjusting screws. It has been customary to use wing bolt screws. These did not permit the close adjustments that should go with a regulator as fine as the Rego Red Star. It was found that special shaped hexagonal adjusting screws would solve this problem, so they were adopted.

It was found that inexperienced operators somethings rely on gauge-readings to set the torch flame. The experienced welder never adjusts his flame in this manner. The recognized good practice among operators who know their trade, is to adjust the flame with torch valves wide open and without reference to gauge readings. The Red Star Regulator is designed so that it not only can be used for welding and cutting but both operations can be some simultaneously. A separate high pressure outlet with a needle valve is provided on the first-stage line. When the operator does not need his cutting torch, he simply closes this needle valve. Then, too, there are no delicate or easily broken parts in the Rego Red Star regulator.

An automatic Safety Outlet releases any abnormal or excess pressure caused by accident to any part of the equipment.

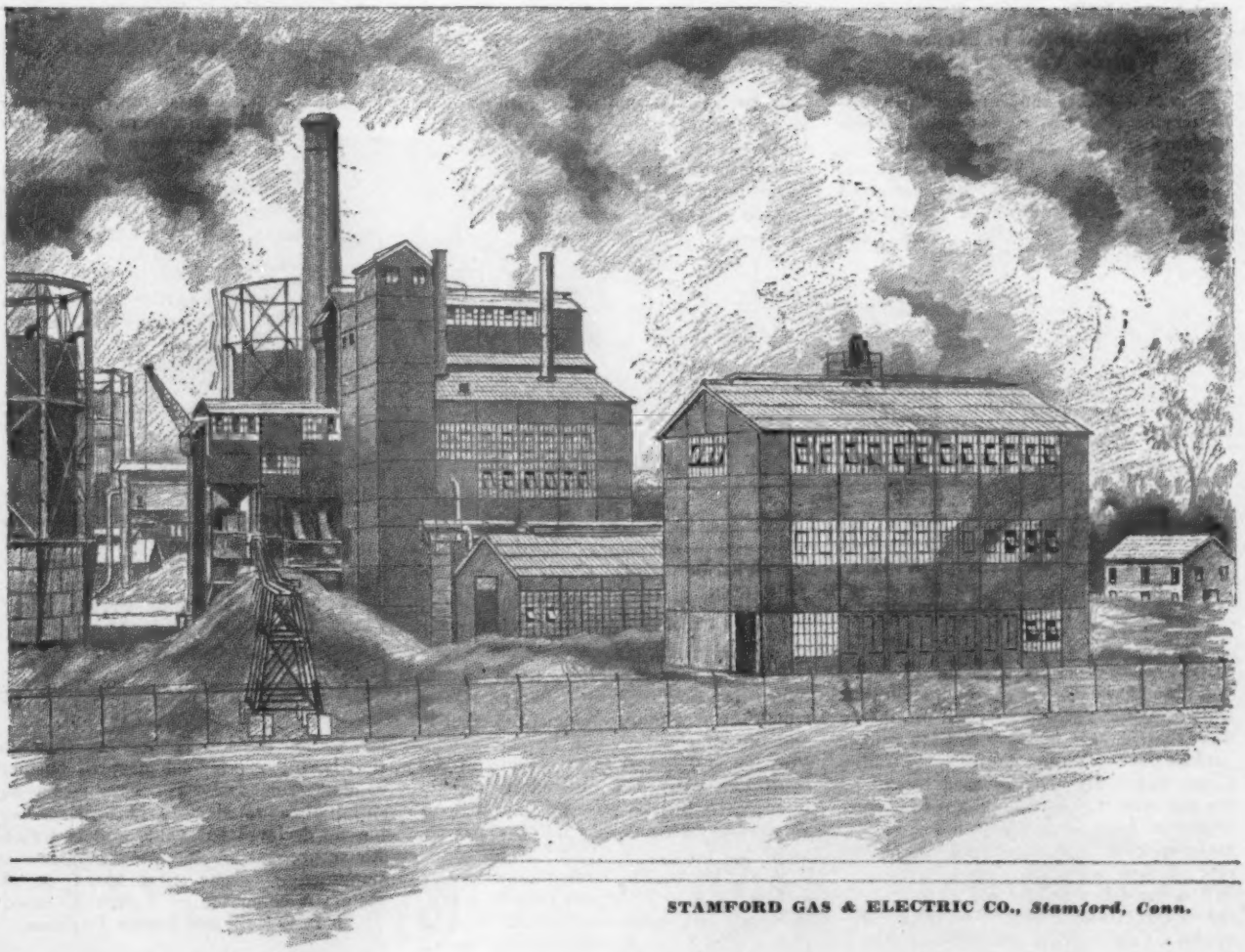
Five types of regulators are included in the Red Star line, No. 1660 for use with oxygen tanks, Nos. 1663 and 1665 for use with acetylene tanks, and Nos. 1666 and 1667 for use with hydrogen tanks.

(*Equipment News continued on page 82*)

New Illuminating Gas Cutting Torch

The Alexander Milburn Company, Baltimore, Maryland, have recently brought out a low pressure torch especially developed for use with city gas, natural gas or by-product coke oven gas, either scrubbed or unscrubbed. This torch utilizes the highly specialized and standardized parts of the Milburn cutting torches. It insures a correct and intimate mixture of the gases resulting in "super mixing" and greater efficiency. It performs practically all the cutting operations within range of the process, especially heavy plate, casting risers and billets. It is not recommended for continuous rivet or staybolt cutting.

The torch is made of bronze forgings and special seamless tubing, constructed to withstand constant service. It is evenly balanced and ruggedly built. The tips are made of solid copper designed to rapidly pre-heat and cut.



STAMFORD GAS & ELECTRIC CO., *Stamford, Conn.*

Another— Gas Utility Produces Its Base Load With Coal Gas.

Glover-West Vertical Retorts, with a daily capacity of 1,100,000 cu. ft., were installed at Stamford in 1926. This is the plant where the A. G. A. Carbonization Committee conducted the tests for their report at the 1927 convention.

The design of Glover-West Retorts is such that you get maximum yields of gas, coke and tar with minimum operating costs.

Other Glover-West Installations

Fitchburg, Mass.
Springfield, Mass.
Portland, Me.
Ottawa, Ont.
Vancouver, B. C.
Victoria, B. C.
Watertown, N. Y.
Malden, Mass.
Fargo, N. D.
Toronto, Ont.
Santos, So. America
Pernambuco, So. Amer.
Santiago, So. America
Buenos Aires, So. America
Pawtucket, R. I.
Fall River, Mass.
Faribault, Minn.
Halifax, N. S.
Belleville, Ont.
Rio de Janeiro, So. America

WEST GAS IMPROVEMENT COMPANY, 441 Lexington Ave., New York

Builders of Coal Gas Plants

Glover·West

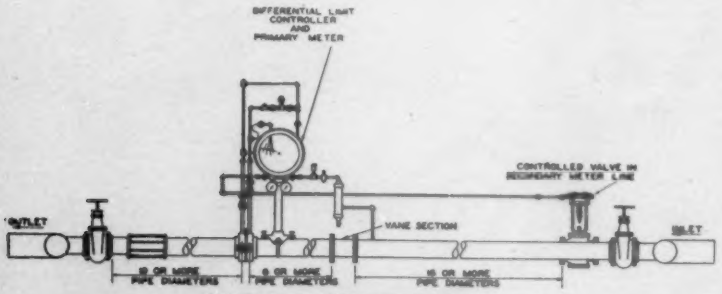
VERTICAL·RETORTS

Foxboro Differential Limit Controller Applied to Metering Widely Varying Flow

The satisfactory measurement of widely varying flow has always been a troublesome problem, particularly to the Natural Gas Industry. The Foxboro Company of Foxboro, Mass., has perfected a new instrument called a Differential Limit Recorder-Controller. This Controller, when working with the Foxboro Gas Meter in the type of installation shown in Fig. A., will successfully meter flow that is varying over a wide range.

Once installed, the Differential Limit Controller continually gives a record of the gas flow through the line. This controller is known as the primary meter. It is specified to handle the minimum rate of flow with commercial accuracy. When the differential range is exceeded, the control functions and automatically opens a valve which puts the secondary meter in operation. This secondary meter is a complete Foxboro Gas Flow Meter operating in the by-pass. When the secondary meter goes into operation it doubles the effective capacity of the set up.

As soon as the secondary meter line is open the differential pressure drops, because of the increased capacity. The valve in the secondary meter line is held open by the controller until the flow is again within the capacity of the primary meter. The valve is then closed automatically and the primary meter again assumes the entire load. The operation is entirely automatic from start to finish.



DUPLEX FLOW-METER INSTALLATION
with
AUTOMATIC DIFFERENTIAL LIMIT CONTROLLER

Positive and flexible control is obtained by the fact that the points, at which the secondary meter is to be cut in and out of the line, can be set at will. Positive action and tight closing of the controlled valve are insured by having it operated by the gas line pressure or an auxiliary air supply of 15 lbs. per sq. inch.

Single Meters or Wide-Range Meters or more than one by-pass may be installed in various combinations with the new Differential Limit Controller to meter all cases of varying flow. With this new development, the troublesome problem to the Natural Gas Industry of correct metering wide range flow as been relegated to the past. Bulletin will be mailed on request.

Convention Calendar

July

7-25 Summer Course for Home Service Directors, Columbia University, New York, N. Y. Dr. C. J. Lynde, Dodge Hall, Teachers College, Columbia University.

31-Aug. 1 Wisconsin Utilities Association, Commercial Section Convention, Green Bay, Wis. John N. Cadby, 105 Wells Street, Milwaukee, Wis., executive secretary.

September

9-12 Pacific Coast Gas Association, Hotel Huntington, Pasadena, Cal. Clifford Johnstone, 447 Sutter St., San Francisco, Cal. secretary.

18-19 Empire State Gas & Electric Association, Saranac Inn, N. Y., C. H. B. Chapin, Grand Central Terminal, N. Y. C., secretary.

23-24 Indiana Gas Association, Annual Convention, French Lick, Ind. F. W. Budd, Muncie, Ind., secretary-treasurer.

NEWS OF THE GAS INDUSTRY

Gas Pipe Line Augmented

Due to an increased gas consumption in Houston and along the gulf coast, E. H. Nuckner, president of the Houston Pipe Line Company, has authorized a construction program which will greatly increase the capacity of this firm's lines in its territory.

The principal link in the new work will be the laying of a 25½-mile auxiliary line from Refugio to a point near Fannin, in Goliad county where it will join both the 18-inch main line and the 12-inch auxiliary loop through that district, which was completed last year. The new auxiliary line will be a 12-inch line leading direct from the La Rosa compressor station.

Completion of this line will materially increase the capacity of the system which last year had a daily consumption of more than 95,000,000 cubic feet of natural gas. Delivery thus far this year has averaged more than 100,000,000 cubic feet daily.

Booster equipment along this line has been strengthened.

New Corporation Formed

Articles of incorporation have been filed with the secretary of state of Indiana by the Indiana Gas Service Corporation having a principal place of business in Anderson, Ind. The corporation has an initial capital stock of 1,000 shares having no declared par value and is formed "to secure gas by wells or purchase or manufacture.' The first board of directors is composed of Robert A. Schott, Philip B. O'Neill and Luther F. Pence.

Natural Gas Turned on at Meridien, Miss.

Meridien, Miss., was added to the list of Southern cities using natural gas recently, when valves at the two new regulating stations were turned on and natural gas admitted to the mains.

The event signalized the completion of more than one month of work, including the construction of a branch line from the main line of the company, the completion of a new compressor station at Reform, Ala., and the converting of all gas-burning appliances in the city for the use of natural gas.

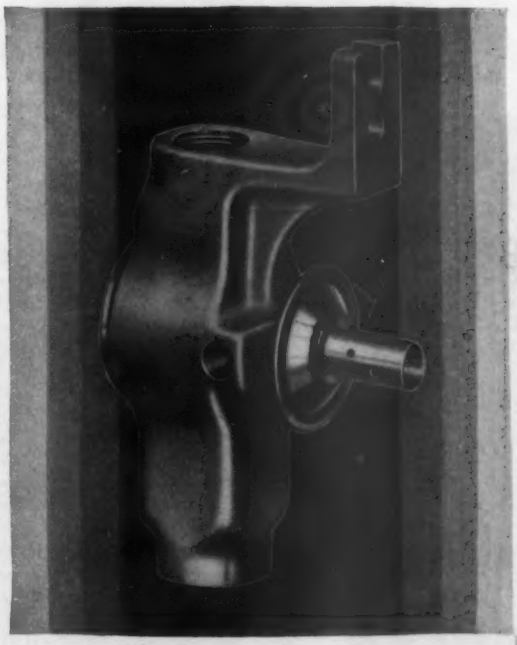
A huge gas torch burning at the office of the Mississippi Service Company announced the fact that the gas had been turned on.

J. P. Steinhauer is manager of the Meridien branch of the Mississippi Service Company. A campaign for the use of natural gas for house heating will be started at once, it is announced, and other drives will be conducted to introduce gas appliances.

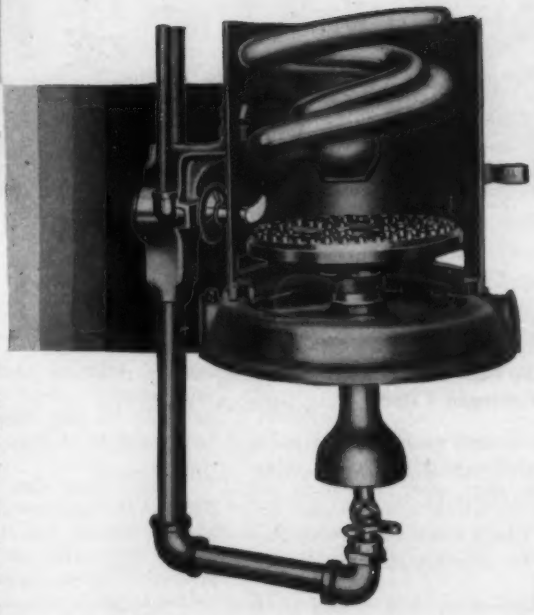
Other cities in Mississippi using natural gas include Vicksburg, Kosciusko, Columbus and Yazoo City.

(*News continued on page 84*)

THE KLIXON SAFETY PILOT FOR CIRCULATING TANK HEATERS



Contains the Famous.. SPENCER THERMOSTATIC DISC



THE Klixon Safety Pilot is built around the famous snap-acting Spencer Thermostatic Disc, which insures reliability and economy of operation. There are no moving parts except the disc and the main gas valve. There are no adjustments to make,—no service to give. It acts with a powerful click that makes the valve self-cleaning. Installation can be easily and quickly made, and is profitable to handle, for there is but one style and size for all heaters. For prices or additional information write—now.

SPENCER THERMOSTAT CO

CAMBRIDGE · · · MASS

Consolidated Gas of New York Awarded Prizes for Display Windows

The windows of the Consolidated Gas Company were awarded first prize in the Utility Group at the Eastern Division Display Men's Convention, held at the Hotel Pennsylvania, New York, June 9th to 12th, inclusive.

In addition, these windows were awarded first, second and third prizes at the International Association of Display Men's Convention in Chicago, June 16th to 19th, inclusive.

Prize Window Display

Natural Gas Rates Established for Georgia Cities

Rates on natural gas for Barnesville, Calhoun, Cedartown, Forsyth, Milledgeville, Newnan, Rockmart, Thomaston and other cities to which natural gas will soon be delivered, have just been laid down by the Georgia Public Service Commission.

The net rate on natural gas in these cities, not subject to discount, will be as follows: $1.40 for the first thousand cubic feet; $1.20 for the second thousand; 95 cents for the third thousand, and 75 cents for all above 5,000 cubic feet. There will also be a service charge of $1.00 per month, and all bills are subject to a discount of 10 per cent if paid within 10 days.

The rates were submitted to the commission by the Georgia Natural Gas Corporation, and were accepted practically without question. They are virtually the same as those now in force in Atlanta and its suburban cities.

Plan Construction Work

The Jackson County Light, Heat and Power Company at Independence, Missouri, is planning new construction work this summer, which will be under the direction of the Superintendent of the Independence Company, Harold Johnston.

At the present time the communities of Englewood, Maywood, Fairland Heights, Mount Washington and Fairmount are served by mains carrying intermediate pressure. These communities, which are between Independence and Kansas City, Missouri, have approximately 2,000 meters, and it is the intention of the Independence company to convert the entire section to low pressure.

In order to carry out this program it will be necessary to lay about 11,000 feet of 6-inch pipe; 3,000 feet of 4-inch pipe and some 8-inch and 2-inch pipe. The company will also install three district regulators, one 8-inch and two 6-inch.

Will Use Much Natural Gas

A contract calling for three billion cubic feet of natural gas, at a price of 18 cents per 1,000 cubic feet and 17 cents for all over that, was signed by president Louis C. Cates of the Phelps-Dodge Corporation and president Paul Kayser of the Western Gas Company. The gas is to be piped from Texas and Oklahoma to the Phelps-Dodge mines in Arizona.

Southern California Gas Company Increases Appropriation for Extensions

The Southern California Gas Company, according to A. B. Macbeth, the President, has increased the amount set aside for extensions and betterments during 1930 to a total of five and a half million dollars. The additional construction program will materially increase the gas transmission facilities from the fields in the San Joaquin Valley to the Los Angeles Basin area, and will further ensure the supply of natural gas to homes and industries. Seven-and-a-half miles of twenty-two inch pipe line will be laid from the terminus of twenty-inch Kettleman Hills line at Buena Vista Junction. This will carry gas to their Compressor Station 40, which is having its capacity increased so that it can handle seventy-five million cubic feet of gas daily. Forty miles of twenty-two inch line will also be laid parallel to the present twelve-inch line over the Ridge Route, and seventeen miles of the same sized line will be constructed from Newhall to Ventura Boulevard. Thence a twenty-six-inch line will be run through Sepulveda Canyon to Pico Boulevard. In addition to the increase in capacity of Compressor Station 40, a new terminal is to be built at Newhall, with modern cottages for the operating employees and their families, and a building to be used as an office. Another terminal station is to be erected at Sepulveda and Pico Boulevard.

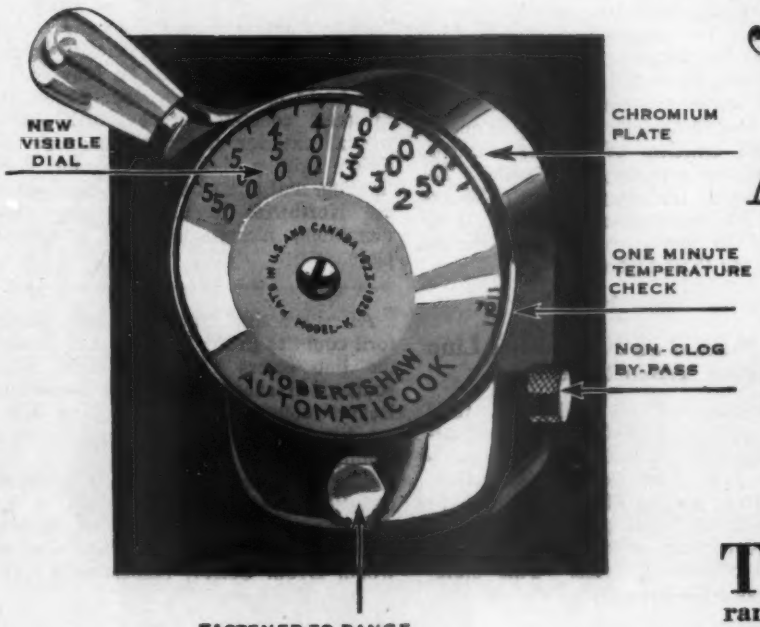
In addition to these lines in the San Joaquin Valley and in the neighborhood of Los Angeles, five miles of sixteen-inch pipe line will be constructed from the Southern California Gas Company's present Compressor Station at Ventura through Hall Canyon, to Mills Road Junction. Preliminary plans have been completed, the pipe has been ordered, and actual construction is expected to begin during July. It is believed that the major portion of this work will be finished, and that the lines will be placed in operation soon after December first, this year.

Permission Sought to Transact Business in Indiana

Officials of the Natural Gas Pipeline Company of America, a Delaware corporation, have filed papers with the secretary of state in Indianapolis qualifying the company to transact business in Indiana. The company manufactures, stores and sells both natural and artificial gas and has 150 shares of its capital stock represented in Indiana. Owen Pickens, Fletcher Trust building, Indianapolis, is named Indiana agent for service of process.

(*News continued on page 86*)

Here it is!
The New Improved "K" Type AutomatiCook *with 5 great Features*



THE NEW "K" type AutomatiCook has five great features to make gas range selling easier for you. Here they are: (1) Handsome chromium plate finish. (2) Fully visible dial. (3) Fool-proof One-Minute Temperature Check. (4) Non-Clog by-pass. (5) Only *one* bolt attachment to range.

The new AutomatiCook is smaller, more handsome, more compact. It's better looking. There's a One-Minute Temperature Check. Every working part is accessible from outside of range.

More than 100 makes of the new ranges will be AutomatiCook equipped this year. Learn all about this greatly improved heat control now. Write for full descriptive literature . . . *today!* It might result in your selling more ranges this season.

ROBERTSHAW AutomatiCook

ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Penna.

Erect Hortonsphere in Frankfort, Ind.

The Chicago Bridge & Iron Works is building a Hortonsphere for the Northern Indiana Public Service Company at the gas plant in Frankfort, Ind. The novel type of high pressure gas holder is relatively small in size. While it holds 340,000 cubic feet of gas at 50 pounds pressure, it is only 57½ feet in diameter. The Hortonsphere will be located adjacent to the present 100,00 cubic-foot lift type holder at the company's plant. It will serve to increase the amount of gas storage at the plant and will be connected by a high pressure transmission line 4 inches in diameter and 17 miles long, serving patrons at Lebanon, Ind.

American Standards Year Book

Important progress in standardization work affecting mechanical, electrical, railways, mining and other major American industries is reported in the American Standards Year Book for 1930, just published by the American Standards Association.

George B. Cortelyou, President of the Consolidated Gas Company of New York, in a foreword to the Year Book says:

"Standardization is of prime importance at the present time to practically every American industry as a means of promoting industrial stabilization and of minimizing unemployment.

"It permits the continuous production of products and parts, during periods of slackened buying, in anticipation of future demand. For the same reason, it makes for steady employment of labor. It broadens markets nationally, and even internationally.

"As a principal means of introducing improvements in design and economies in production and distribution, it furthers the sound development of industries and helps to open potential markets. On these grounds alone it merits sympathetic study on the part of every business executive."

"The new projects initiated during 1929 include such subjects as annular ball bearing, methods of laboratory sampling and analyses of coal and coke, standardization of Diesel fuel oils, specifications for coal mine cars and for mine timbering, locomotives for coal mines, graphical symbols used in radio communication, and general methods of testing woven textile fabrics," says W. J. Serrill, President American Standards Association.

Anyone wishing copies of the American Standards Year Book may obtain them free of charge by writing to the American Standards Association, 29 West 39th Street, New York.

Advertising Agency Gets Tenny Account

Charles H. Tenny & Company, operating public utilities, both gas and electric, in Massachusetts and Eastern New York, have placed their advertising account with the Boston office of Doremus & Company, advertising agency.

Award Prizes to Employees for Practical Suggestions

In order to encourage employees in making suggestions for the benefit of the company or for the gas making industry at large, The Philadelphia Gas Works Company has decided to award prizes to employees for suggestions made which prove to be practical. These prizes will range from $2 to $10 and will be given for all recommendations adopted. This covers new ideas, improvements in operation and criticism of present methods, provided that a remedy is suggested. All employees of the company, with the exception of department heads and those engaged in special research work, are eligible for these awards.

Work Started on Natural Gas Line from Texas to Indiana

Five thousand men, drawing total monthly pay of $650,000 now are actually engaged in the building of Missouri-Kansas Pipe Line Company's gigantic new system, costing $40,000,000 from the Panhandle of Texas to eastern Indiana and connecting with the company's western Kentucky fields. This statement was made recently by the management of the company which further announced that work has now been under way on the 1,250-mile line for several weeks. When completed the line will link all of the company's properties into a single, complete unit, embracing approximately a half million acres of gas land, numerous compressor stations, 2,500 miles of pipe line and a market territory of several million people.

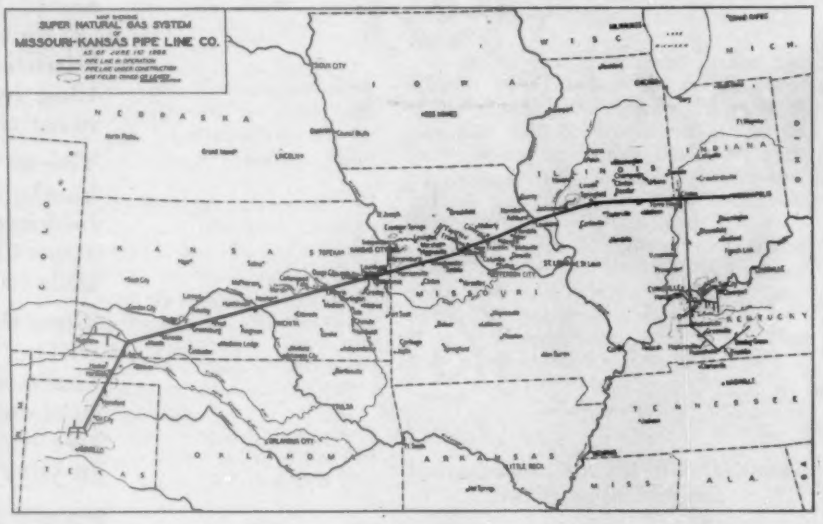
Northern States Power Co. to Erect New Building

R. F. Pack, vice president and general manager, Northern States Power Company, has announced plans for the Company's new office building which is to be erected in St. Paul, Minn. The new building, according to Mr. Pack, will be in keeping with the several new office structures erected during the last few years by utility companies in the Standard Gas and Electric Company system under the management of Byllesby Engineering and Management Corporation, of which the Northern States Power Company is one. The building will be six stories in height. Construction was started on May 28. It will be of modern skyscraper design, reinforced concrete, stone finish, ornamental exterior design, modernistic interior lighting, beautiful exterior flood lighting, and one of the first buildings in the Northwest to use the late metal aluminum, nickel steel and chromium plate.

After crossing Hutchinson and Handford counties in the Panhandle of Texas, the line enters Oklahoma eight miles south of Hardesty, traversing Texas and Beaver counties before reaching Kansas two miles south of Liberal, Seward county.

The balance of the route through counties by states is as follows:

Kansas: Meade, Clark, Ford, Kiowa, Pratt, Reno, Harvey, Butler, Greenwood, Lyon, Coffey, Anderson, Franklin and Miami.



Missouri-Kansas Pipe Line System

Missouri: Cass, Johnson, Pettis, Cooper, Howard, Boone, Audrain, Ralls and Pile.

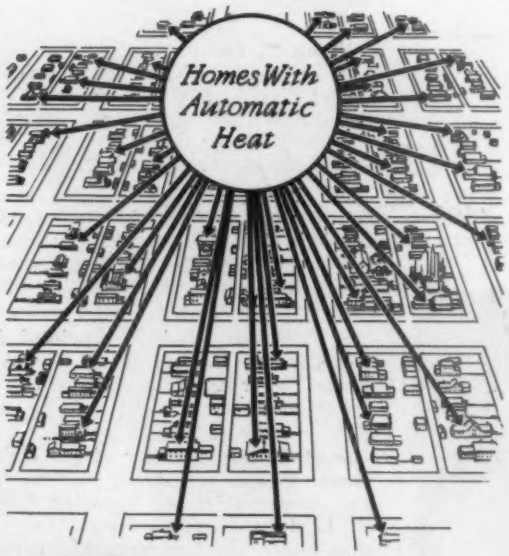
Illinois: Pike, Scott, Morgan, Sangamon, Moultrie, Douglas and Edgar.

Indiana: Parke, Putnam, Hendricks, Marion, Vigo, Clay, Sullivan, Knox, Gibson and Vanderburg.

Kentucky: Henderson and Webster counties.

Every Home with *Automatic Heat*

is a PROSPECT *for Gas-Fired Incineration*



. . . . . **KERNIT** INCINERATION . . . . .

or

. . . . **KLEENBURN** INCINERATION . . . .

is the answer to the waste, trash and rubbish disposal problem of every home with automatic heat. These owners are sold on comfort and CLEANLINESS. Kernit and Kleenburn gas-fired Incinerators bring to these modern homes a superlative measure of clean, healthful service.

You do not have to create a market for Kernit or Kleenburn—it is ready, and it has the money to buy. Every strictly modern home needs and wants the service these appliances bring. They also find ready sale to hospitals, schools, banks, undertakers, institutions and industrials.

Gas companies, from coast to coast, are demonstrating that Kernit and Kleenburn sales are made quickly, profitably and with less effort than on any other appliance in the same price range.

WRITE NOW FOR

Complete Details of the

KERNIT SALES PLAN

KERNIT INCINERATOR COMPANY

Milwaukee, Wisconsin

Affiliated with KERNER INCINERATOR COMPANY

PERSONALS

D. L. Cash who has been with American Gas & Electric Co, for the past six years as commercial manager at Rockford, Ill. and at Atlanta, Ga., has jointed Columbia system as district sales manager for Columbia gas properties in the Pittsburgh area. Mr. Cash assumed his new duties recently and will make his headquarters in Pittsburgh.

W. A. Bertke has succeeded Frank W. Budd as treasurer of the Central Indiana Gas Company with headquarters at Muncie, Ind. He comes from Greenville, O., where he served as division manager of the United Public Service Company. Mr. Budd has taken a position with a Kansas gas company.

E. J. Ludeman, formerly in the sales department of the Puget Sound Power & Light Company, Chehalis, has accepted the position of sales manager with the Washington Gas and Electric Company at Longview, Wash.

W. D. Sproule recently joined the Gulf States Utilities Company at Lake Charles, La., and will have charge of the merchandise department.

Elliott G. Peabody recently assumed the duties of general sales manager of the Baton Rouge Electric Company, Baton Rouge, La. Mr. Peabody was formerly merchandise sales manager of the Fall River, Mass., Gas Works Company.

Lewis A. Keen was elected vice-president of the Haverhill, Mass., Gas Light Company at a recent meeting of the directors of that company. Irving L. Stine was elected treasurer and assistant clerk of the corporation.

A. R. Frahn, former general superintendent of the Wisconsin division of the Northern States Power Company, has been promoted to the position of superintendent of the St. Paul division. E. H. Cotton, assistant general superintendent of the Wisconsin division since 1927, will assume the post of superintendent to succeed Mr. Frahn.

W. R. Bell recently assumed the position of general superintendent in charge of operation and sales of the Baton Rouge, La., Electric Company. He was formerly connected with the El Paso Electric Company.

L. W. Barnes is now Division Commercial Manager of the Southeastern Division of the Wisconsin Power & Light Company, which comprises both the Beloit and Lake Geneva Districts.

E. D. Alexander was recently elected president of the Illinois Northern Utilities Company, Dixon, Ill. Mr. G. B. Fluehr, formerly District Superintendent of District A, of the foregoing company, succeeds Mr. Alexander as vice-president.

Mr. Alexander has been in charge of operations of the Northern Utilities Company since its formation in 1912.

Wiley F. Corl has been elected a vice president of The United Gas Improvement Company, according to announcement made recently by John E. Zimmermann, president of the company.

Mr. Corl, who is president of Commonwealth Utilities Corporation, became associated with U. G. I. late last year when U. G. I. acquired a controlling interest in that company, whose subsidiaries operate in fifty-three communities in Ohio, Arizona, Kentucky, Missouri, Oklahoma, Kansas and Texas. He was born in Missouri and was graduated from the University of Missouri in electrical engineering in 1908.

Wiley F. Corl

After graduation for several years he was engaged in engineering and construction work. In 1913, he joined the Southern Illinois Light and Power Company, which operated public utility properties in southern Illinois, first as general superintendent and later as vice-president. In 1918 he acquired an interest in the Missouri Utilities Company, Mexico, Mo., and later became president of the Community Power & Light Company, a holding company, which had subsidiaries operating in Kansas, Arkansas, Missouri, Texas and New Mexico.

In 1925, he resigned the presidency of Community Power & Light Company, and organized Commonwealth Utilities Corporation.

Mr. Corl is a pioneer in the extension of transmission lines to small communities and in the centralization of power production facilities in such communities.

R. D. Webster, formerly sales manager of the Webster and Southbridge Gas & Electric Company has been promoted to the position of general superintendent of that company, succeeding John W. Gale. Mr. Gale was appointed assistant to Mr. W. C. Bell, Vice-president of the New England Power Asso. Mr. Webster's headquarters will be at Webster, Mass.

Frank T. Dowd has been appointed sales manager of the Webster & Southbridge Gas & Electric Company. Mr. Dowd was formerly with the Gardner Electric Light Company. He will have his headquarters at Southbridge, Mass.

J. L. Kelley, formerly district commercial manager of the Wisconsin Power & Light Co., Beloit, has been transferred to the Madison, Wis., office.

R. C. Burton has been appointed district commercial manager of the Wisconsin Power & Light Co., Beloit, Wisconsin.

Scott Turner, Director of the United States Bureau of Mines, received on June twenty-third the honorary degree of Doctor of Engineering from his alma mater, the University of Michigan A few days before he received the honorary degree of Doctor of Science from the Colorado School of Mines.

R. A. Cuthbertson, who has been with The Ohio Public Service Company more than ten years, is being transferred from his position of office manager at Cleveland to that of auditor of the Crew-Levick Company, with headquarters at Philadelphia.

Robert E. Montgomery, of St. Louis, was recently appointed commercial manager for the Belleville District of the Illinois Power and Light Corporation, succeeding P. E. Wilson, who resigned because of ill health. Mr. Montgomery has had much experience in central station merchandising and is fully qualified for the position. He was formerly employed by the Laclede Gas Company at St. Louis.

Warren A. Norris, president of the Lebanon (Pa.) Valley Gas Company, recently was elected first vice-president of the Lebanon Chamber of Commerce, to serve for one year.

Since going to Lebanon in 1925 Mr. Norris has taken an active interest in Chamber of Commerce work and other civic activities. At present he is a member of the Chamber's Board of Directors.

J. S. Parker, formerly superintendent of the Spring Garden district of the Philadelphia, Pa., Gas Works Company, has been appointed Division Superintendent in charge of pressures, street lighting and post inspection. J. Lucena succeeds Mr. Parker as superintendent of the Spring Garden district.

(*Personals continued on page 90*)

A size for every kitchen and every cooking need.

NEW LIFE IN GAS RANGE SALES!

The new Smoothtop will put new life in your gas range sales. It is the outstanding gas range specialty . . . the only gas range of its kind on the market. New, exclusive cooking features permit new easier, better cooking methods.

National advertising tells to the housewives of your city the story of the new Smoothtop's enclosed-top, 4-heat zone cooking that "Captures the Flavor ...Frees the Cook". In addition to local newspaper advertising helps, floor displays, window displays and cooking schools, you can have free training of your staff in up-to-date salesmanship.

No competition...once you've sold a prospect on Smoothtop's features she cannot shop around the corner and buy it elsewhere. And remember Smoothtop's longer specialty profit!

Write while dealership is open . . . to Standard Gas Equipment Corporation, 18 East 41st Street, New York City. Makers of . . . Smoothtop . . . Oriole . . . Acorn . . . Vulcan . . . the standard domestic and heavy-duty gas ranges wherever gas is used. Pacific Coast Distributor: Northwest Gas & Electric Equipment Co., Portland, San Francisco, Los Angeles.

Smoothtop

GAS RANGE

CAPTURES THE FLAVOR . . . FREES THE COOK

F. J. Schafer was elected a vice-president of the Southern California Gas Company at a recent meeting of the Board of Directors. Mr. Schafer was formerly general manager. He has been with the company ever since it started operation over twenty-three years ago.

Mr. Schafer, a native of Ohio, came to California many years ago. Thirty-five years ago he became connected with the Public Utilities in Los Angeles and upon the formation of the Southern California Gas Company he accepted the position of Assistant superintendent. He is a past president and an active member of the Pacific Coast Gas Association, the National Association of Power Engineers and the American Society of Engineers.

William Moeller, Jr. was also elected a vice-president of the Southern California Gas Company. Mr. Moeller was manager of Natural Gas Production and Transmission.

Mr. Moeller was born in New York State. He attended the Stevens Preparatory School at Hoboken, New Jersey, and then entered the Stevens Institute of Technology. After receiving his Engineering Degree he was employed by the American Sugar Refining Company in New Jersey, the Buffalo and Susquehanna Railroad in Pennsylvania, and for the Kansas Natural Gas Company in Kansas and Oklahoma. In 1914 he came to the Midway Gas Company, at that time a Company affiliated with the Southern California Gas Company, as Chief Engineer. He later became Assistant General Manager of the Midway Gas Company, was then made General Manager, and since the consolidation of the Midway and the Southern California Gas Companies he has been Manager of Natural Gas Production and Transmission, until his election as Vice-President.

Mr. Moeller has been active as a Director and Committee Chairman in the American Gas Association, and Pacific Coast Gas Association, and is a member of the American Society of Mechanical Engineers

William M. Halsey has been appointed Essex Division agent of the Public Service Electric Gas Company, Newark, N. J., to succeed Harry H. Wells, who retired recently. Mr. Halsey has had long experience in the gas industry, having started with the Newark Gas Company in 1896.

Frank W. Budd resigned recently as divisional manager of the Central Indiana Gas Company, Muncie and accepted a position in Kansas. He was with the company twelve years. Mr. Budd is secretary of the Indiana Gas Association.

Conrad N. Lauer, a vice-president of The United Gas Improvement Company and president, Philadelphia Gas Works Company, was the principal speaker at the fifty-eighth Commencement of Stevens Institute of Technology, Hoboken, N. J., recently and was one of four to receive honorary degrees. Mr. Lauer received the honorary degree of mechanical engineer as "an operating engineer proven by years of recognized attainment."

Mr. Lauer, who is the founder of the Herbert Hoover medal, annually to be awarded to an engineer distinguishing himself in public service, is also president, Ugite Sales Corporation and Utilities Realty Company; vice president, Regional Planning Federation of the Philadelphia Tri-State District, and of the Philadelphia Chamber of Commerce; secretary, Philadelphia Gas Commission and a director or member of numerous industrial corporations, governmental and civic commissions and technical societies.

Louis Stein, formerly Gas Engineer of the Northern States Power Company, Minneapolis, Minn., has been appointed Director of Gas Sales of that company. Mr. Stein has had wide experience in the gas industry. For several years he was general gas superintendent of the Wisconsin Minnesota Light & Power Co., Eau Claire, Wisconsin. In 1923 Mr. Stein was appointed gas engineer of the Northern States Power Company, which position he held until his recent promotion.

Amos H. Abbott succeeds Mr. Stein as Gas Engineer. Mr. Abbott was formerly Assistant Gas Engineer and this position will be filled by Mr. Robert L. Rundorff.

Leonard F. Nelson, in charge of advertising for the Oklahoma Gas & Electric Company, has been elected president of the Oklahoma City Advertising Club. Mr. Nelson is also editor of the Oklahoma Meter.

Lillian Grogan, an employee of The Brooklyn Union Gas Company, recently sailed for Europe on the S. S. Roosevelt to inspect the World War battlefields, as a guest of the United States Government. She is one of the Gold Star contingent.

Mrs. Grogan is the widow of a former employee of the Brooklyn Union Gas Company, Frank A. Grogan, who is believed to have been killed during the battle of Mt. Faucon on October 23, 1918.

Ralph A. Arvesen has recently been appointed Superintendent of the Quincy Division of the Boston Consolidated Gas Company, Boston, Mass. Mr. Arvesen was formerly in the Distribution Department.

Clarence H. Geist and Edward Hopkinson, Jr., were elected directors of The United Gas Improvement Company recently following the board's action increasing its number from fourteen to sixteen members. The company's executive committee also was increased from nine to ten members and Mr. Hopkinson was elected the additional member.

Mr. Geist is prominent in the public utility field, having operated electric, gas and water properties serving more than five hundred municipalities, large and small.

Mr. Hopkinson is a partner of Drexel & Company and J. P. Morgan & Company and was recently elected a director of United Corporation.

TRADE NEWS

United Engineers & Constructors, Inc., Activities

The Connecticut Light & Power Company of Waterbury, Conn. has awarded a contract for equipping 2-7′ sets with The U. G. I. Heavy Oil Process.

The New Haven Gas Light Company of New Haven, Conn. has awarded a contract covering the remodeling of 12′ set, automatic control machine, waste heat boiler, foundations, Smoot Steam Accumulator, and also equipping set with U. G. I. Heavy Oil Process, and changes to one 8′ 6″ set.

An order has been received for three (3) Model "B" U. G. I. Automatic Control Machines, for Yokohoma, Japan.

The Hudson Valley Fuel Corporation of Troy, N. Y. has awarded contract to furnish and construct 1500 feet of 12″ gas main from River to East side of the Hudson River to the Compressor Room of the Hudson Valley Fuel Corporation.

The Allentown-Bethlehem Gas Company, of Allentown, Penna., has awarded contract to furnish and install 8100 feet of 6″ welded steel main between Bethlehem and Butztown, Penna., also contracts to furnish and construct 4700 feet of 8″ welded steel main, 5280 feet of 4″ welded steel main, and 9000 feet of 2″ galvanized steel screwed main between Butztown and Miller Heights, Penna., and furnish and construct 3800 feet of 8″ welded steel main, 6100 feet of 6″ welded steel main, 39,000 feet of 4″ welded steel main and 10,560 feet of 2″ galvanized screwed main between Bethlehem and Bath, Penna.

F. A. Arnesen Made Manager

F. A. Arnesen, for the past several years connected with the Tulsa office of the Pittsburgh Equitable Meter Company, has been promoted to the position of manager of the Dallas, Texas office.

(*Trade News continued on page 92*)

SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs

SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD
has 14,000 Manufacturing Establishments of which many have World-Wide Reputations.

"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY
1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

Semet-Solvay Erect Coke Screening Plant in Birmingham

The Sloss-Sheffield Steel & Iron Company of Birmingham, Alabama has placed in service a new coke screening and sizing plant, designed and built by the Semet-Solvay Engineering Corporation.

Coke screening and sizing plant

The plant embodies the newest developments in the preparation of coke. The best design and most convenient arrangement for operation have been incorporated in the assembly of conveyors, screens, crusher, loading, electrical system and track layout. Coke for industrial and domestic uses, from the largest sizes to breeze can be loaded rapidly. Six cars can be filled simultaneously with various grades of coke.

Materials produced in the South entered largely into the construction of this modern plant.

New Philfuels Plants

Four new Philfuels process butane-air manufactured gas plants have been put into operation within the last month, according to an announcement by Philfuels Company, Detroit, Michigan, subsidiary of Phillips Petroleum Company.

Two of the plants, one owned by the Central West Public Service Company located at Sheldon, Iowa, and one owned by the Missouri Public Service Company located at Clinton, Missouri, were converted from carbureted water-gas to butane. The other two plants, one located at Chadron, Nebraska, owned by Chadron Gas Company, and one at Clarinda, Iowa, owned by the Central States Electric Company, are new illustrations.

Approximately twenty other Philfuels process butane plants are now under construction in Illinois, Tennessee, Massachusetts, Missouri, Kansas, Iowa, Gorgia, Maine, Minnesota, Virginia and Wisconsin, according to Philfuels officials.

Partlow Corporation Move to Larger Plant

The Partlow Corporation, Utica, New York, who manufacture indicating heat controls and gas burning equipment, announce their removal to a much larger plant in Utica.

This business was established January 1, 1921 by Mr. Howard W. Partlow and this is the third time it has been necessary to secure a larger plant to take care of their increasing business.

New Safety Gas Main Catalog

The Safety Gas Main Stopper Company, 523 Atlantic Avenue, Brooklyn, New York, have just issued a catalog price list #32. It is a 32 page book printed in two colors and covers their entire line of gas distribution supplies and street department supplies. Practically every item they manufacture is illustrated and accompanied with complete descriptions as to sizes, capacities, etc. A copy of the catalog will be mailed upon request.

American Pipe Manual Ready for Distribution

The eighth edition, American Pipe Manual, has just come from the press, and is now ready for distribution to all users of cast iron pipe and fittings.

More than thirty-five thousand copies of previous editions are in circulation. The manual is handy and easy to use. It is of such size that it can either be carried in the pocket or used as a desk or library book in the office. It is made to stand wear, printed on strong paper and bound so that the pages will stay together, and with ordinary care will last for years.

The book is divided into ten sections, the titles of which are as follows:

Section 1, History; Section 2, Bell and Spigot Pipe and Fittings for Water Service; Section 3, Pipe for Gas Service; Section 4, Mono-Cast Centrifugal Pipe; Section 5, Flanged Pipe and Fittings, A. W. W. A. Standard; Section 6, Flanged Pipe and Fittings, American Standard; Section 7, Special Joints for Cast Iron Pipe; Section 8, Cement Lined Pipe; Section 9, Acipco Cast Iron Columns; Section 10, Miscellaneous Tables and General Information for Water and Gas Works Superintendents and Contractors.

Anyone interested in receiving a copy of this manual may obtain it by writing to American Cast Iron Pipe Co., Birmingham, Ala., or nearest office.

Burner Companies Join Consolidation

The Gas Combustion Co. and Duquesne Burner Service Co. have joined the Swindell-Dressler Corporation with offices and plant at Pittsburgh, Pa. Address is P. O. Box 1753. The other companies in the consolidation are William Swindell & Bros. and American Dressler Tunnel Kilns, Inc.

The Gas Combustion Co. manufacture pressure burners for blast furnace boilers and stoves. They also manufacture the Falls Automatic Engine Stop, a safety device for preventing fly wheel explosions.

Duquesne Burner Service Co. manufacture gas burners for industrial and heating boilers and industrial furnaces.

William Swindell & Bros. manufacture a complete line of combustion and electric furnaces for ferrous and non-ferrous melting, heat treating, annealing, etc.

American Dressler Tunnel Kilns, Inc. design and build continuous furnaces for heat treating and annealing. They also build tunnel kilns for the ceramic field.

As the consolidation marks the 80th Anniversary of the founding of William Swindell & Bros., the oldest company in the consolidation, an interesting book, "80 Years of Progress," has been issued commemorating this event.

Officers of the Swindell-Dressler Corporation include: John F. Casey, President; Philip Dressler, William Cosgrove, Frank W. Brooke and Ralph W. Porter, Vice Presidents; Samuel B. Casey, Treasurer; Ralph E. Whittaker, Secretary; H. W. Paret, Jr., Manager Burner Division; L. A. Vincent, Sales Manager.

(*Trade News continued on page 94*)

The First Cast Iron Meters used in BUTANE GAS were SPRAGUE METERS

These Meters are giving Complete Satisfaction

Sprague Meters and Regulators
for Carburetted Butane and
Bottled Gas Services

SPRAGUE METER CO.
BRIDGEPORT, CONN.

American Stove Company Announces New Sales Policy

The American Stove Company recently announced a complete change in the organization of its selling and distribution methods.

This company formerly maintained separate sales organizations for each of its manufacturing divisions.

The new plan which became operative July 1, 1930 will bring about a closer contact between themselves, their dealers and their consumers.

The six divisions of the company hereafter will be Manufacturing Divisions only. These divisions are: George M. Clark & Company Division, Harvey, Ill.; Dangler Stove Company Division, Cleveland, Ohio; Direct Action Stove Company Division, Lorain, Ohio; New Process Stove Company Division, Cleveland, Ohio; Quick Meal Stove Company Division, St. Louis, Mo.; Reliable Stove Company Division, Cleveland, Ohio.

In line with the new policy the entire United States and Canada have been divided into seven sales districts to be known as Sales Divisions of American Stove Company.

A manager has been appointed for each of these districts, who, with the group of salesmen assigned to him, will have complete charge of the sales in his district of all gas-burning appliances produced by American Stove Company.

The new sales organization is as follows: Stanley E. Little, Vice President in Charge of Sales, 1825 E. 40th St., Cleveland, Ohio; C. A. Young, Manager, Eastern Sales Division, Bridge Plaza East on Skillman Place, Long Island City, N. Y.; W. E. Kirby, Manager, Atlantic Sales Division, Terminal Commerce Bldg., 401 North Broad St., Philadelphia, Pa.; John C. Brown, Manager, South Eastern Sales Division, 253 Peachtree St., Atlanta, Ga.; J. H. Kirby, Manager, Central Sales Division, 4301 Perkins Ave., Cleveland, Ohio; A. F. Millikan, Manager, Northern Sales Division, 179 North Michigan Ave., Chicago, Ill.; R. L. Kahle, Manager, South Western Sales Division, 825 Chouteau Ave., St. Louis, Mo.; E. P. Millikan, Manager, Pacific Sales Division, 274 Brannan St., San Francisco, Calif.; Irvin W. Peffly, Manager, Export Department, Bridge Plaza East on Skillman Place, Long Island City, N. Y.; H. C. Fritz, Manager, Custom-Built Range Sales Department, 4711 Perkins Ave., Cleveland, Ohio; B. R. Tritton, General Credit Manager, 4301 Perkins Ave., Cleveland, Ohio; Thomas Rath, Vice President, Director of Publicity, Lorain, Ohio.

The Eastern Sales Division District includes all of New England, eastern New York, northern New Jersey and eastern Canada.

The Atlantic Sales Division District includes Maryland, Delaware, Virginia, eastern Pennsylvania and southern New Jersey.

The South Eastern Sales Division District includes North and South Carolina, Georgia, Florida, Alabama, Mississippi and Tennessee.

The Central Sales Division District includes Ohio, West Virginia, Kentucky, western Pennsylvania, western New York and southern Indiana.

The Northern Sales Division District includes northern Indiana, Michigan, northern Illinois, Wisconsin, Iowa, Minnesota, North and South Dakota, Nebraska, Colorado, Utah, Wyoming, Montana and central Canada.

The Southwestern Sales Division District includes southern Illinois, Missouri, Kansas, Oklahoma, Arkansas, Louisiana, Texas and New Mexico.

The Pacific Sales Division District includes Washington, Oregon, Idaho, California, Nevada, Arizona and western Canada.

Semet Solvay Engineering Corp. Contracts

The Northern Indiana Public Service Company has ordered an accumulator to be installed at the local gas plant at South Bend.

Contract has been awarded to furnish the Atmospheric relief piping at the Raritan power plant, Sayreville, N. J., for the Management and Engineering Corporation of Chicago.

Contract has been awarded to build and erect for the Imperial Oil Refineries, Ltd., of Halifax, N. S., a 3 compartment welded steel purifier, with manifold and overhead structure. The apparatus will be fabricated by arc welding in the Semet-Solvay shops and shipped complete ready for setting on the foundation.

Long Island Lighting Company has ordered additional stacks of sherardized cooling coils, to be installed with the present Semet-Solvay cooling equipment.

World-Wide Distribution of Safety Gas Main Stoppers and Bags

As an indication of the world-wide use of gas, The Safety Gas Main Stopper Co., of Brooklyn, N. Y., report recent shipments of their gas main bags and stoppers to Cairo, Egypt; Capetown, South Africa; Lancashire, England and Brazil, South America.

Brown Instrument Company to Increase Plant

The steadily increasing demand for Brown Pyrometers, Flow Meters, and other industrial instruments manufactured by The Brown Instrument Company of Philadelphia, Pa., necessitated additions to their plant in 1928 and 1929. The continuing growth of the business having again justified expansion, the Brown Instrument Company has just let a contract for 40,000 square feet of additional floor space to the Robert E. Lamb Co. of Philadelphia, Pa.

This extra space will be in the form of two additional floors on all of the new two-story concrete sections of the plant. Construction will be started ver. shortly and the new space will be c cupied early this Fall.

A. O. Smith Increases Force

The great demand for oil and gas piping by companies all over the United States has enabled the A. O. Smith plant to maintain a large number of employes for several months. Their army of workmen was announced during the middle of June to be 7,088, as compared to 7,682 at the same time in 1929. There are heavy orders on hand in several departments, among them the gas and crude oil divisions. There are hundreds of miles of pipes still to be made and indications are that the large force of workers will be kept employed for some time to come. Several weeks ago 200 men are added, and since then more have been hired.

Schweitzer & Conrad Merges with Cutler-Hammer

Announcement is made by Cutler-Hammer, Inc., Milwaukee, Wis., that on July 1st, they acquired all common stock of Schweitzer & Conrad, Inc., Chicago manufacturers of high voltage equipment.

Schweitzer & Conrad will continue to operate as an independent manufacturing and selling unit. No changes in organization or personnel will be made except Mr. Beverly L. Worden, President of Cutler-Hammer has also been elected President of Schweitzer & Conrad.

Mr. Conrad and Mr. Schweitzer have been retained as consulting engineers and will continue their interest in the management as members of the Board of Directors.

Michigan Valve & Foundry Company Buys Columbus Valve & Manufacturing Co.

The Michigan Valve & Foundry Company, Detroit, Mich., has purchased the business, plant and assets of the Columbus Valve & Manufacturing Company of Columbus, Ohio, makers of plug type valves.

The plug type valve now being manufactured under the present organization has a wide range of pressures and incorporates developments of especial interest to the petroleum and natural gas industries, to the process industries generally and to the steam power plants—in fact for any work where pipe pressures and velocities are high or where high pressure is accompanied by high temperature conditions.

The Columbus plant will continue to be used exclusively for plug valve production, while the gate valves, sluice gates and other Michigan products will be handled by the Detroit Plant. The operations of both plants will be directed by Mr. R. J. Goldie, the Company's General Manager. Executive offices remain in Detroit.

Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

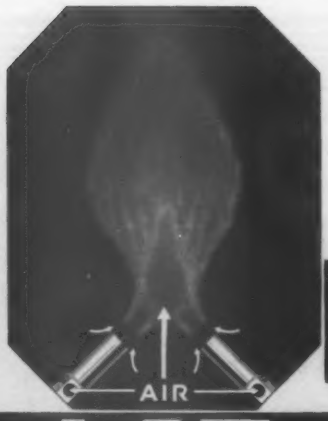
Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

"A" Type Meters "B" Type Meters

THE CLEVELAND GAS METER COMPANY

2168-2180 East 65th Street Cleveland. Ohio

The perfect combustion or burning of gas is dependent upon its union with a proper amount of oxygen as may be extracted from the air. Note how the exclusive, ingenious BARBER PATENTED JET PRINCIPLE accomplishes perfect combustion, liberating all the heat contained in the gas.



ONLY MAKE THIS

Barber Burner No. 324-A $98.50

Fully Automatic and Completely Equipped.
For Grate Dimensions of 18 to 20 inches incl.

1→
2→
3→

Those who are qualified to judge say that this new Barber Burner line will make a great nation-wide increase in gas heating.

If you are interested in Conversion Gas Burner sales write for Complete Information and new Sales Data.

NOTHING FINER CAN BE SAID ABOUT ANY GAS APPLIANCE

BARBER COULD ANNOUNCEMENT

A new line of Conversion Gas Burners has been developed using the famous Barber Patented Burner principle. This line of Burners presents the following features:

The lowest price ever offered for a high-grade fully automatic Conversion Gas Burner.

High operating efficiency that challenges comparison from gas burning apparatus of any kind or price.

Unequaled simplicity of installation and operating reliability.

THAN THAT IT IS EQUIPPED WITH BARBER BURNERS

THE BARBER GAS BURNER CO.
FORMERLY THE CLEVELAND GAS BURNER AND APPLIANCE CO.
3702 SUPERIOR AVENUE « » CLEVELAND, OHIO

A Sound Investment— CE-CO Paints

The preservation of gas holders and other metal structures through scientifically formulated paint protection, has been our specialized study for over half a century. We have, therefore, perfected a CE-CO protective paint to meet each specific requirement of the gas industry.

CE-CO Technical Paints have ably met all these requirements. The proof is shown by the number of the largest gas plants in which CE-CO specialized paints have been in use for many years and have always rendered the most satisfactory service.

The economy of a special paint for a special purpose, such as CE-CO Holder Paint, has been demonstrated over and over again wherever CE-CO Technical Paints have been applied.

It will be a sound investment to use CE-CO Paints on your next Holder painting job, and other structural painting work throughout the gas plant.

Send for Bulletins and color cards

TECHNICAL CE-CO PAINTS

Cheesman-Elliot Company, Inc.

Established 1876

TECHNICAL PAINT MAKERS

639-647 Kent Avenue - Brooklyn, N. Y.

Works at Brooklyn, N. Y. and Williamsport, Pa.

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Published by manufacturers of Gas Equipment and Appliances for you. Order by number, using coupon on Page 107.

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Carefree Summer Days *why not* Carefree WINTER DAYS?

That's the interrupting idea—the interesting appeal built around "Heating with Gas"—in the summer advertising and merchandising campaign of *Janitrol*—the automatically controlled conversion burner.

The thought of bringing Carefree Summer Days into homes and residences during the coldest winter months should prompt thousands of home owners to start thinking of "Heating with Gas" this coming winter. It will encourage them to equip their furnaces to burn Gas, the ideal fuel—the automatically controlled fuel for that first wintry blast to come.

Incidentally this summer campaign includes the story of *Janitrol*—how it is made use of as a tool to heating with Gas—how it automatically controls the heating problems of home owners.

You should have a copy of this Summer Advertising Portfolio. It will assist you in promoting the use of Gas for house-heating purposes. Write or wire for your copy.

Carefree SUMMER DAYS why not Carefree WINTER DAYS?
Carefree Summer Days why not Carefree WINTER DAYS?
Carefree Summer Days
HEATS WITH GAS
JANITROL
Fire your furnace from your EASY CHAIR

The Surface Combustion Co.

INCORPORATED

Subsidiary of Henry L. Doherty & Co.

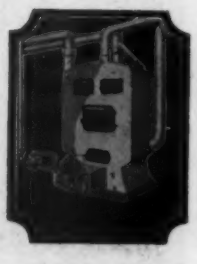
2375 DORR STREET, TOLEDO, OHIO

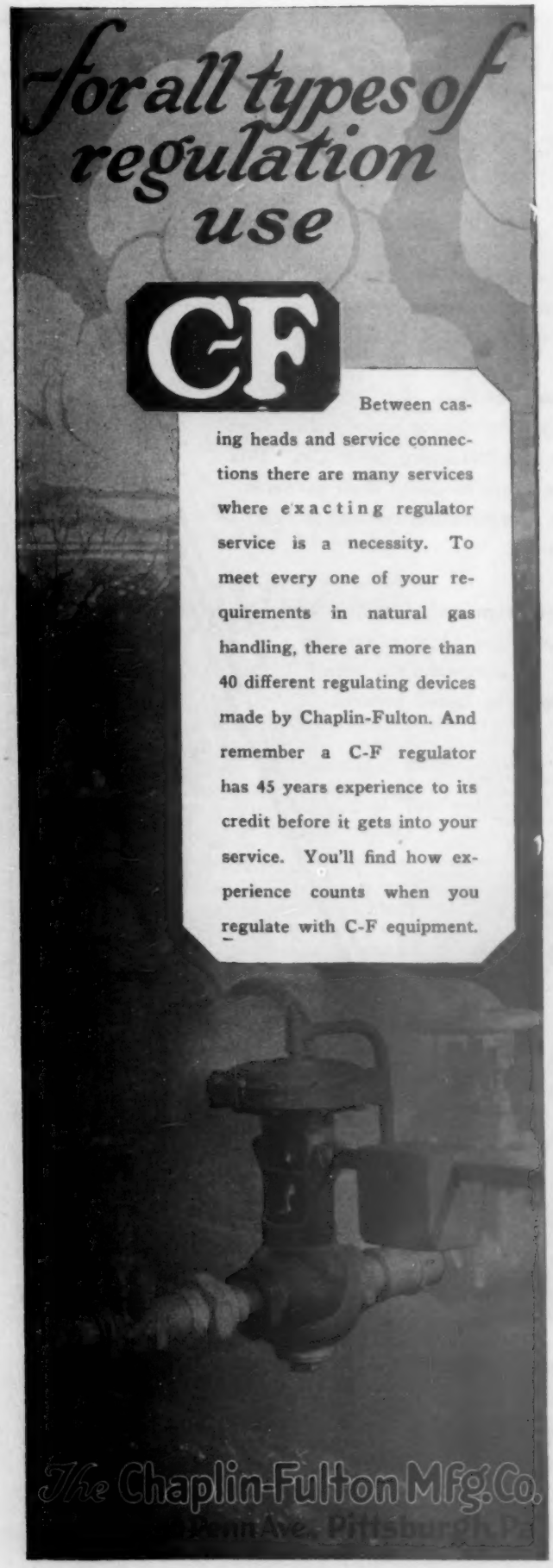
Branch Offices in All Principal Cities

Mantle Recuperator Division
METALLIC RECUPERATORS

Webster Engineering Co.
WEBSTER BOILER BURNERS

There is a Janitrol to fit almost any Furnace or Boiler




for all types of regulation use
CF
Between casing heads and service connections there are many services where exacting regulator service is a necessity. To meet every one of your requirements in natural gas handling, there are more than 40 different regulating devices made by Chaplin-Fulton. And remember a C-F regulator has 45 years experience to its credit before it gets into your service. You'll find how experience counts when you regulate with C-F equipment.
The Chaplin-Fulton Mfg. Co.

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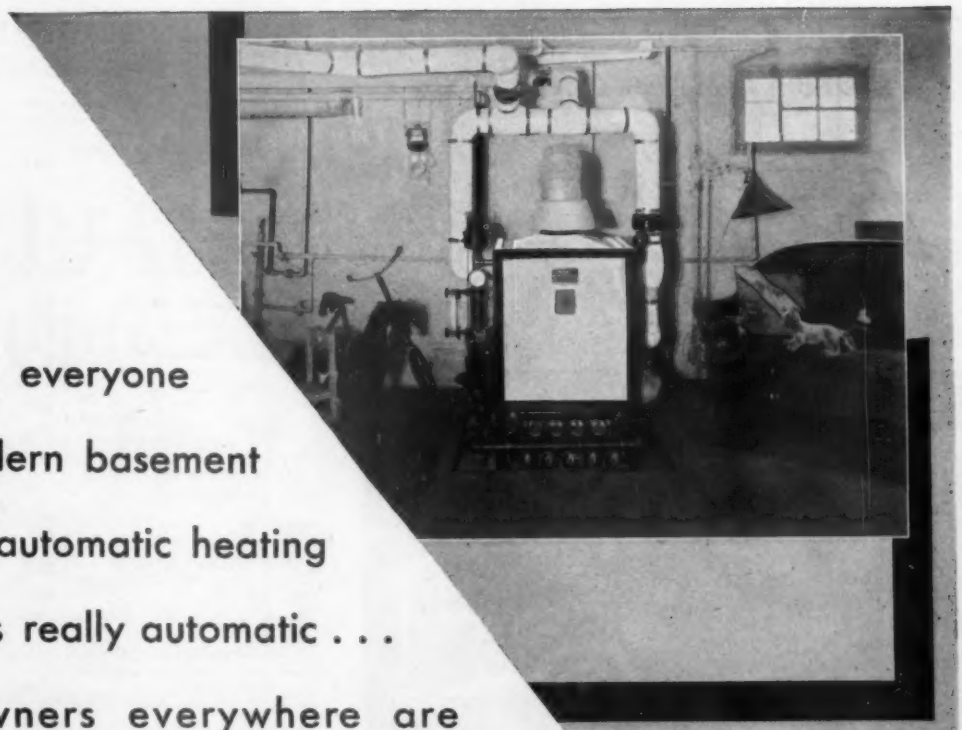
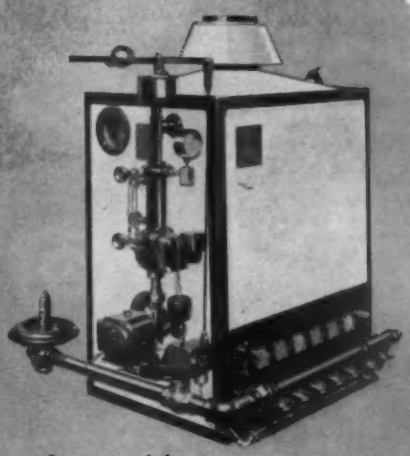


. . . . . everyone
wants a modern basement
. . . and automatic heating
that is really automatic . . .
owners everywhere are
quick to see the advantages
of Ideal Gas Boilers — the
product of the largest man-
ufacturer of heating equip-
ment in the world . . . that
is why they are selling so
fast . . . are you getting
your share of this profit-
able business? . . .

IDEAL GAS BOILERS



Manufactured by
AMERICAN RADIATOR COMPANY

Distributed by
AMERICAN GAS PRODUCTS CORPORATION
CHRYSLER BUILDING, NEW YORK

here "traffic must go on!"

THE

ARMCO *Jacking Method*

Armco Jacking in the heart of downtown Cleveland, where 26,000 vehicles pass daily. The white broken line shows direction of Armco Corrugated Iron Pipe jacked under the street, to be used as conduit for steam lines supplying steam to Cleveland's new union railroad terminal group.

WHERE traffic must flow steadily on schedule the Armco Jacking Method* demonstrates the power of its economy. Under transcontinental railways or in the center of a busy city, modern jacking "under and through" has definitely taken the place of expensive, traffic-delaying open trenching. Incalculable waste is overcome.

And the actual cost of obtaining openings for conduits by the Armco Jacking Method is 30 to 50 per cent under the cost of older methods. There is not even a moment's interference with traffic and there is no injury to the pavement or to adjoining buildings.

To the many advantages of the Armco Jacking Method is added the great durability of Armco Corrugated Iron Pipe, with a record as the longest-lasting corrugated metal pipe made.

Armco engineers, operating in all parts of the United States and Canada, will show you examples of where and how the Armco Jacking Method has effected better, safer and more economical installations under varying conditions. Write for complete data.

Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand.

ARMCO CULVERT MANUFACTURERS ASSOCIATION
Middletown, Ohio.

*** The Armco Jacking Method was developed by Armco engineers as a traffic non-interference method of obtaining openings under streets and railways for gas mains and other public utility conduits.**

C, 1930, A.C.M.A.

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This FREE TRIAL OFFER *stepped up sendout* 1080 MCF *yearly!*

In first two months of operation, Indiana public service company sells an Electrolux a day in a small industrial community

LOCAL NEWSPAPERS *carried the story of the Electrolux 60-day trial offer right into the homes.*

ORDINARILY, you don't expect to sell many automatic refrigerators in a small industrial community. Most of the workers rent their homes . . . are not even sure of regular employment.

Yet 60 Electrolux refrigerators were sold in two months in a district like this centering around Hammond, Ind. To put it over, the Northern Indiana Public Service Company made use of this free trial offer.

They offered every customer a 60-day trial of Electrolux. The only guarantee required was a $10 down payment. And even this was to be returned at the end of the trial period if the customer was not entirely satisfied.

Four newspaper advertisements, like the one shown above, were inserted during the month in the local papers. These carried the announcement of the offer. Customers began signing up immediately. And sales proved so gratifying that the next month a 30-day trial period was offered.

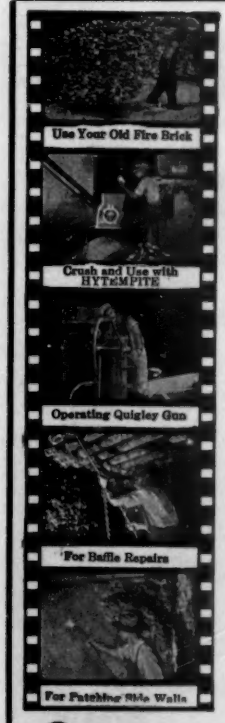
In two short months, 1080 MCF were added to the yearly domestic load. Because every Electrolux installed increases billing an average of 18,000 cubic feet a year. In addition, the gas company realized a profit on the sale of the refrigerators themselves.

Progressive gas companies have been quick to grasp the enormous load-building possibilities in the sale of Electrolux. Electrolux transforms small domestic accounts into permanent large accounts . . . builds up the off-hour load . . . creates new prestige for the gas industry. For further information about ways to merchandise the free trial offer—or other sales plans—write, wire or telephone Electrolux Refrigerator Sales, Inc., Evansville, Indiana.

ELECTROLUX

THE *Gas* REFRIGERATOR

A tiny gas flame takes the *place of all moving parts*



HYTEMPITE

is the universally used high temperature cement for Gas Plants, because it

—insures quick, economical repairs of Retorts, Jamb Joints, Furnace Walls, Arches and Baffles.

—can be used with salvaged, crushed old fire brick.

—not affected by heating and cooling of ovens.

—stands up under severe weather conditions.

—makes thin, strong joint between tile or brick that stands up under extreme abrasive action of clinker tools.

—easily shot into place with Quigley Refractory Gun.

Keep a drum of HYTEMPITE in Retort House or Boiler Room for quick repairs.

QUIGLEY FURNACE SPECIALTIES COMPANY INC.

56 West 45th Street New York

REFRACTORY MATERIALS FOR FURNACE CONSTRUCTION AND MAINTENANCE
ACID PROOF CEMENTS ACID AND ALKALI PROOF COATINGS

Stock and Service through Agents in Every Industrial Center

HEATING BUNKER "C" OIL

for carburetting gas requires high pressure and high temperature.

ANDALE BOWED TUBE HEATERS

remain tight and are easily cleaned. These are the requirements for continuous satisfactory operation.

ANDALE COMPANY

1600 ARCH STREET

PHILADELPHIA

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Wailes Dove-Hermiston Corpn. 200

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YOUR NEXT MOVE
Kernit Incinerator Co. 361

A GOLDEN OPPORTUNITY IN YOUR HAND
Kernit Incinerator Co. 362

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SAID ONE NEIGHBOR TO ANOTHER
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MAKES WASHDAY EASIER
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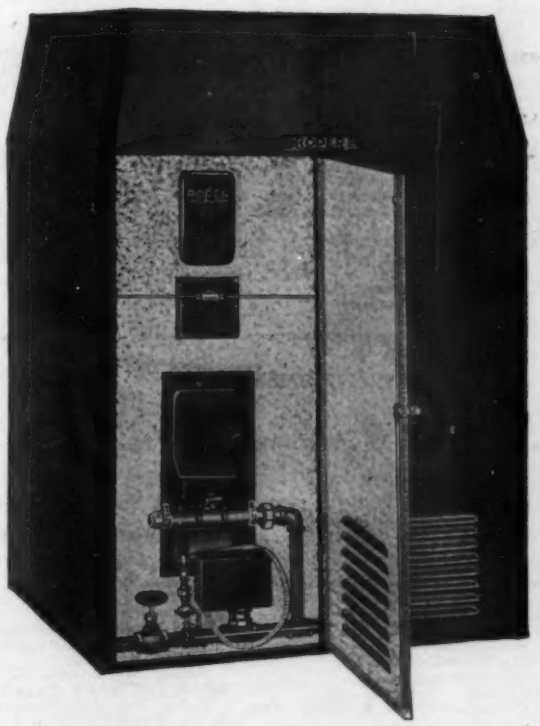
RANGE CATALOG
New Process Stove Co. 268

RANGE CATALOG
Dangler Stove Co. 267

(*Continued on page 107*)

GAS the new fuel king finds its most economical use in the new ROPER gas furnace!



Gas for home heating—once the luxury of the classes—now the clean, convenient, economical necessity of the masses.

With new economies of production and distribution—gas is on the threshold of a new era of usefulness. It is now dethroning coal and oil as king.

It was in anticipation of the coming demand for gas fuel that we developed the Roper Gas Furnace. It is the new heat machine of a new day.

It is constructed in units on the battery plan to fulfill every need of the smallest to the largest home—in the most economical manner. For Roper has engineered into this modern heating plant—fuel conservation and heating efficiency principles—that win instant approval from heating engineers.

The Roper can be furnished with automatic heat control, automatic humidifier, safety pilot, limit control, etc.; in fact, every modern device for health, air conditioning and ministering to the safety and convenience of the home owner.

This new Roper achievement of heavy cast iron construction is A.G.A. approved. It perfectly fits the needs of a new field in which the sales possibilities stagger the imagination. Write for our proposition on the new Roper Gas Furnace.

GEO. D. ROPER CORPORATION
Rockford, Illinois

ROPER

GAS RANGES
GAS FURNACES

COMPLIES WITH NATIONAL SAFETY REQUIREMENTS AMERICAN GAS ASSOCIATION APPROVED

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Smoot Engineering Corp.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

ACETYLENE
The Prest-O-Lite Co., Inc.
Oxweld Acetylene Co.

ACETYLENE EQUIPMENT
American Lava Corp.

ACCOUNTING MACHINES
Remington Rand, Inc.

AMMONIA CONCENTRATORS
Bartlett Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA CONCENTRATED LIQUOR PLANTS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

AMMONIA PIPE
National Tube Company.

AMMONIA RECOVERY APPARATUS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

AMMONIA STILLS
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Cruse-Kemper Co
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA TEST
American Meter Co.

APPRAISALS & INVENTORIES
Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.

APPARATUS
Laboratory Experimental
American Meter Co.
Service
American Meter Co.

ASH REMOVAL EQUIPMENT
Research Corpn.

ASH STORAGE BINS
C. W. Hunt Co., Inc.
Semet-Solvay Engineering Corp.
McClintoc-Marshall Co.
The Stacey Mfg. Co.

AUDITS
United Engineers & Constructors, Inc.

AUTOMATIC CONTROLS FOR WATER GAS APP.
The Brown Instrument Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Co.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co.
Chaplin Fulton Mfg. Co.

BACKRUN GAS EQUIPMENT
Semet-Solvay Engineering Corp.
The Western Gas Construction Co.

BAGS
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BAROMETERS
The Bristol Company
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Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

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The Gas Machinery Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

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Indugas, Inc.
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BENZOL RECOVERY PLANTS
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Connersville Blower Co., The.
Gas Engineering Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BLUE GAS PLANT
Bartlett-Hayward Co.
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Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BOILER FEED SYSTEMS
P. M. Lattner Mfg. Co.

BOILERS (GAS FIRED)
P. M Lattner Mfg. Co.

BOILERS—WASTE HEAT
Bartlett-Hayward Co.
Combustion Engineering Corpn.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

BOOKKEEPING MACHINES
Remington Rand, Inc.

BOOSTERS
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The

BRICK
Fire and Checker
The Gas Machinery Co.
General Refractories Co.
Improved Equipment Co.-Russell Eng. Corp.
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United States Refractories Corp. Silica
The Western Gas Construction Co.
The Gas Machinery Co.
General Refractories Co.
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E. J. Lavino & Company.
United States Refractories Corp. High Alumina
General Refractories Co.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
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BUILDINGS
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The Western Gas Construction Co.

BURNERS (Industrial)
American Lava Corp.
Conversion House Heating
Roberts Gordon Appliance Corpn.
Fuel
Philfuels Co.

BY-PRODUCT COKE
Semet-Solvay Co.

BY-PRODUCT PLANTS
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Indugas, Inc.
The Gas Machinery Co.
International Coal Carbonization Co
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
West Gas Improvement Co.
The Western Gas Construction Co.

CABLE RAILWAYS
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American Meter Co.
Superior Meter Co.

CALORIMETERS
American Meter Co.

CARBIDE
Union Carbide Sales Co.

CARBONIZATION
The Gas Machinery Co.
Low Temperature
International Coal Carbonization Co.

CARBURETTED WATER GAS PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Co.

CARS
C. W. Hunt Co., Inc.
The Western Gas Construction Co.

CASINGS, SEAMLESS STEEL
National Tube Co.

CAST IRON PIPE
Bell & Spigot
Cast Iron Pipe Research Ass'n
United States Pipe & Foundry Co.
The Western Gas Construction Co.

CEMENTS
Acid-proof
General Refractories Co.
Quigley Furnace Spec. Co., Inc.
Firebrick
Refractory & Engineering Corpn. Corpn.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United States Refractories Corp.
High Temperature
Alpha-Lux Company.
General Refractories Co.
E. J. Lavino & Co.
Quigley Furnace Spec. Co., Inc.
Refractory & Engineering Corp.
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Refractory
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Co.
Refractory & Engineering Corpn.
United States Refractories Corp.
Silica
General Refractories Co.
Quigley Furnace Specialties Co.

CHAMBER OVENS
United Engineers & Constructors, Inc.

CHARGING MACHINERY
Bartlett-Hayward Co.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

CHUTES
C. W. Hunt Co., Inc.
Riter-Conley Company.
Robins Conveying Belt Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

CLAMPS (PIPE)
S. R. Dresser Mfg. Co.

CLOCKS & WATCHES, Stop
American Meter Co.

COALS
Boone County Coal Corpn.

COAL GAS APPARATUS
Bartlett-Hayward Co.
Indugas, Inc.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Company.
The Western Gas Construction Company.

COAL & COKE BINS CASTINGS
The Koppers Construction Co.
The Stacey Mfg. Co
The Western Gas Construction Co.

COAL AND COKE HANDLING MACHINERY
Bartlett-Hayward Co.
Dry Quenching Equipment Corp.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.

COAL TAR PRODUCTS
International Combustion, Tar, and Chemical Corpn.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COAL TUBES
C. W. Hunt Co., Inc.
Meter
Superior Meter Co.

COKE CRUSHERS
The Koppers Construction Co.

COKE QUENCHING
Dry Quenching Equipment Corp.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COKE RECLAMATION SYSTEMS
C. W. Hunt Co., Inc.

COMPUTERS
Heating Value
United Engineers & Constructors, Inc.

CONDENSERS
Andale Co.
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
High Duty
Stacey Bros. Gas Const. Co.
United Engineers & Constructors, Inc.
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CONTRACTORS' TUBS
C. W. Hunt Co., Inc.

CONTROLS
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The Brown Instrument Co.
Robertshaw Thermostat Co.
Time-O-Stat Controls Co.
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Gas Pressure
Smoot Engineering Corp.
Gas Producer
Smoot Engineering Corp.
Water Gas Machine
Smoot Engineering Corp.

CONVEYORS
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co

CONVERSION UNITS
Roberts Gordon Appliance Corpn.

COOLERS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
Air
Andale Company.
Ammonia Liquor
Andale Company.
Gas
Andale Company.
Oil
Andale Company.

WATER TO WATER
Audale Company

COOLING COILS
The Gas Machinery Co
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Victaulic Co. of Amer.

COUPLINGS—FLEXIBLE
The P. H. & F. M. Roots Company.

CUBIC FOOT BOTTLES
American Meter Co.
Lambert Meter Co.

CUTTING APPARATUS & SUPPLIES
Union Carbide & Carbon Co.

CRUSHERS
Riter-Conley Company.

DE-EMULSIFIERS
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

DEHYDRATORS, GAS
Andale Company.

MITCHELL

ELECTRIC VIBRATING SCREEN

Especially adaptable to the screening of coal and coke. In the re-screening of coke, the terrific vibrations, occurring 3,600 times a minute, remove all breeze at the lowest cost per ton. It requires minimum floor space and head room. It is self-contained, dust and water proof. Requires less than ¾ H. P. per standard screen.

Send for complete illustrated catalogue.

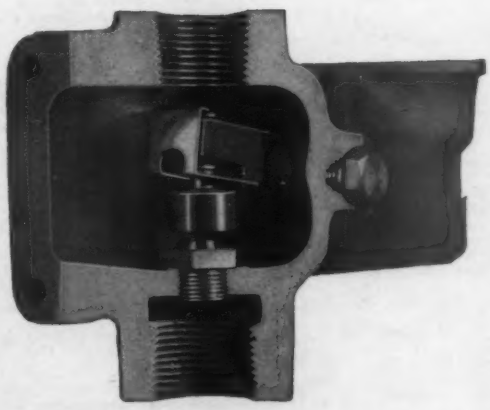
WE DESIGN AND BUILD:

Industrial Railways, Automatic Railways, Cable Railways, Cars, Tracks, Switches, Motor Cars, Scales, Conveyors, Skip Hoists, Electric Vibrating Screens, Cut-off Valves, or Gates, Weighing and Measuring Devices, Coal Crackers, "Stevedore" Transmission Rope.

C.W. HUNT CO. Inc.
WEST NEW BRIGHTON,
STATEN ISLAND, N. Y.
Chicago - Montreal - Boston

HUNT

GROBLE
REGULATORS & GOVERNORS



Accessible and Removable Valve

while the regulator is connected in the service line, is an outstanding feature contained in Groble Service Regulators.

Literature and 1930 prices on request.

GROBLE GAS REGULATOR COMPANY
***Office and Factory*—Anderson, Indiana**

TRADE CATALOGS

(Continued from page 104)

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THERMOSTAT FOR SPACE HEATERS, GARAGE HEATERS, ETC.
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EDITOR, AMERICAN GAS JOURNAL, 53 PARK PLACE, NEW YORK

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Company .....

Address ....

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West Gas Improvement Co.
The Western Gas Construction Company.

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Lambert Meter Co.

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American Meter Co.
Lambert Meter Co
Superior Meter Co.
American Meter Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.

DRAFT GAUGES
The Bristol Company
Brown Instrument Co., The
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

DRYERS (Laundry)
Judelson Dryer Corpn.
W. E. Lamneck Co.

DUPLEX HEATING SYSTEMS
Roberts-Gordon Appliance Corpn.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
C. W. Hunt Co., Inc.

ENGINE INDICATORS
Consolidated Ashcroft Hancock Co., Inc.

ENGINEERS
American Meter Co.
The Gas Machinery Co.
Southwestern Pipe Joint & Eng. Co.
Combustion
Bartlett-Hayward Co.
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
United Engineers & Constructors, Inc.
Consulting
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Gas Engineering Company.
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Isbell-Porter Company
Riter-Conley Company.
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Distribution
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Plain End and Flanged
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GASKETS
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Pittsburgh Equitable Meter Co.
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Superior Meter Co.

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GAS MAIN CONDUITS
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GAS SCREEN
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GASSING MACHINE
American Meter Co.
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GAS TESTING APPARATUS
American Meter Co.
Metric Metal Works.

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Pressure-Recording
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Brown Instrument Co.
Precision Thermometer & Instrument Company.
Siphon
Precision Thermometer & Instrument Company.
Tank
Brown Instrument Co.
Precision Thermometer & Instrument Company.
Water
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GRIDS, for Scrubbers
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GUN-REFRACTORY
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Welsbach Company.

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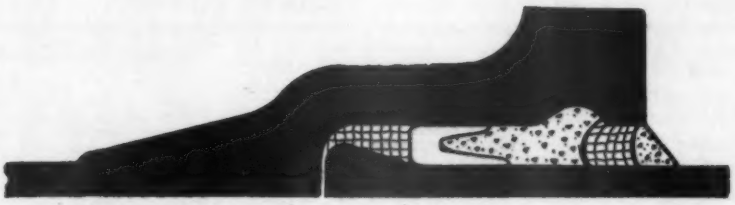

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Safety Gas Main Stopper Co.
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PROVERS—Critical Flow for H. P Field Testing
American Meter Co.
PROVERS—METER
American Meter Co.
Lambert Meter Co.
Pittsburgh Equitable Meter Co
Superior Meter Co.
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Drip
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Gas
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Gas Bag
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Service Cleaner
American Meter Co.
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Gas Purifying Materials Co., Inc
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PURIFIER TRAYS
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Cruse-Kemper Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp
Stacey Bros. Gas Const. Co
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and Plate Work

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RADIATORS—VERTICAL FIN
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Geo. D. Roper Corpn.
Standard Gas Equipment Corp.

RANGES (HOTEL AND RESTAURANT)
Geo. D. Roper Corpn.
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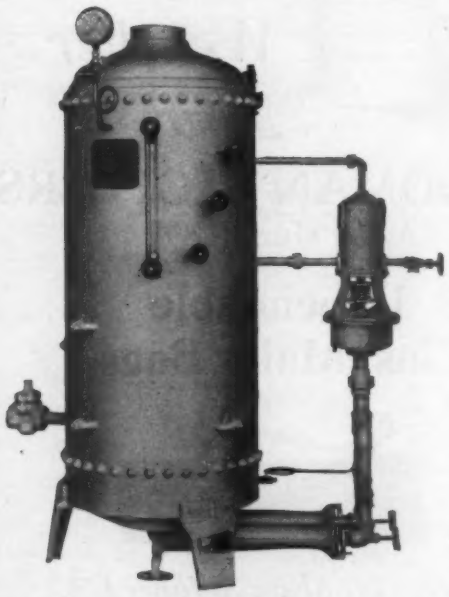

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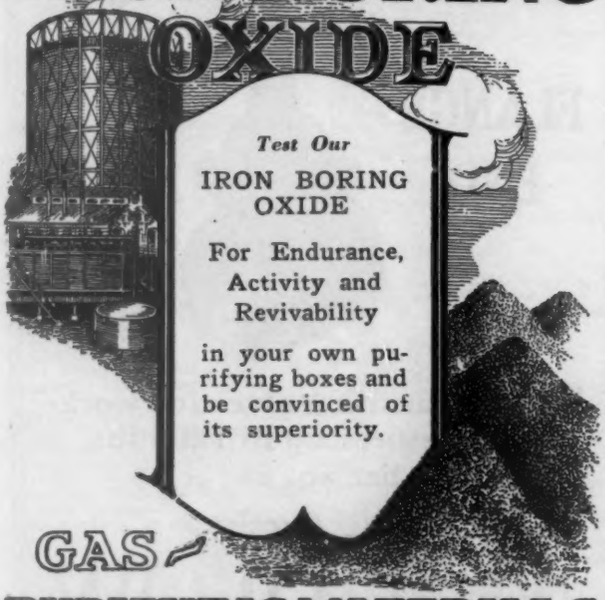

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The transfer books of the Preferred and Common stock will be closed at 2 o'clock P.M., Eastern Standard Time, on July 17, 1930, and remain closed until 9 o'clock A.M., Eastern Standard Time, on August 1, 1930.

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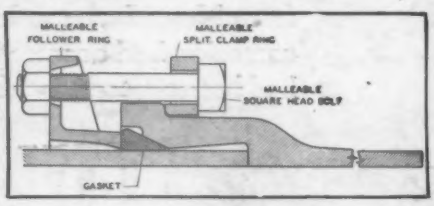

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